

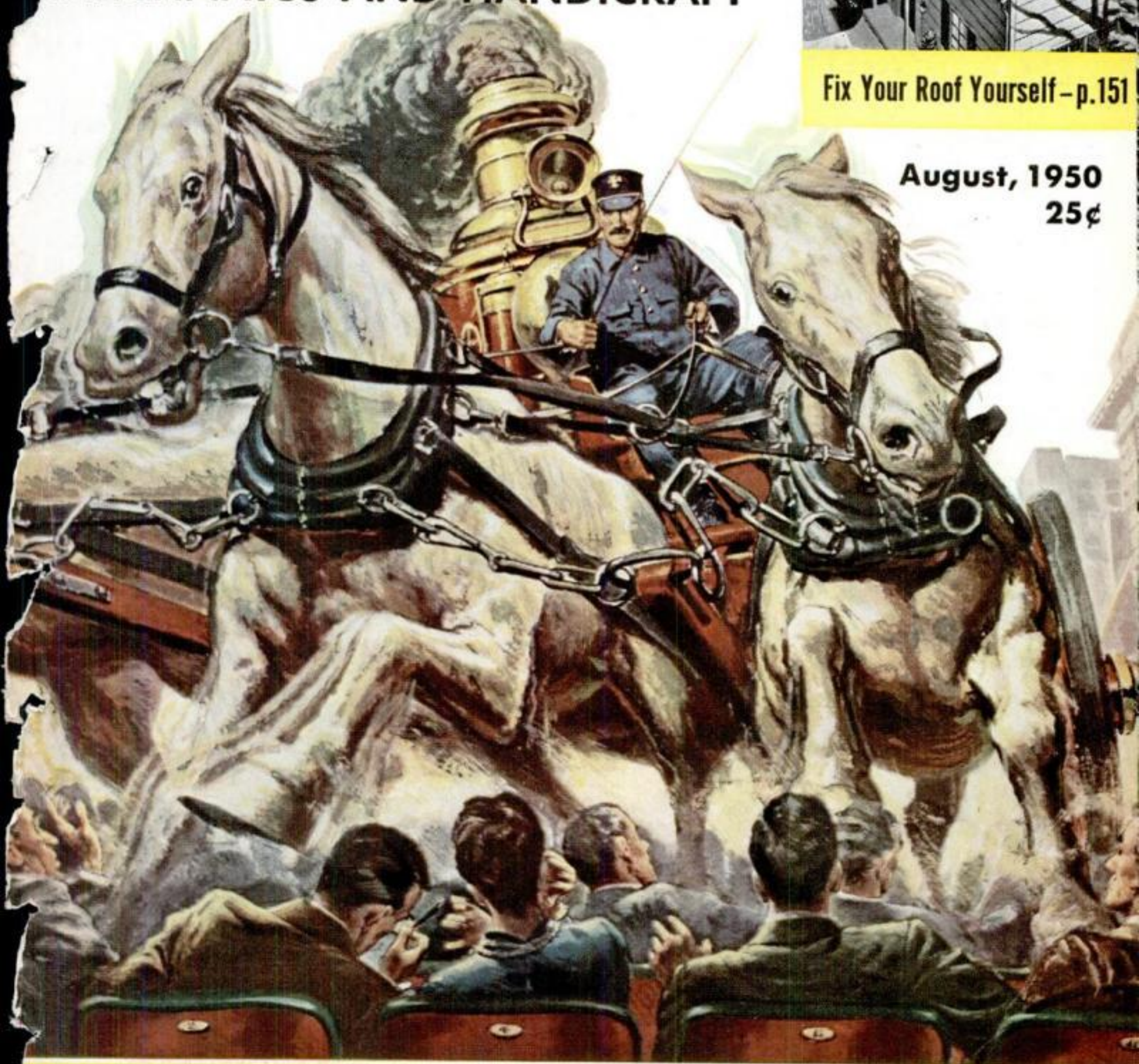
POPULAR SCIENCE

MECHANICS AND HANDICRAFT



Fix Your Roof Yourself—p.151

August, 1950
25¢



Super-Movies Put You in the Show

Thrills that lift you out of your seat... action that goes on right around you... These are the illusions created in a new kind of movie. Panoramic sight and sound put the action right in your lap! Fire engines seem to come

(CONTINUED ON PAGE 75)

Copyrighted material

NOW READY! A Sensational New Line Of 1951 MIDWEST TELEVISION

CONSOLES and COMPLETE
CHASSIS Featuring
The New MAMMOTH
19½-Inch
BLACK PICTURE TUBE
At Low Factory Prices



FACTORY-TO-YOU

Never before have you seen such tremendously BIG, clear pictures, such luxurious cabinets, such sensationally low Factory Prices as Midwest offers in its 31st Anniversary Line of 19½" and 16½" TV Consoles, TV-Radio-Phono combinations, and complete TV Chassis. Features include: Mammoth 19½-Inch Picture Tubes (225 sq. in. image); 16½-Inch Picture Tubes (151 sq. in. image); Video-Sonic Tuner; big 12" Panasonic Speaker; Simplified One-Knob Tuning; Synchronized Sound and Picture, and many other outstanding features.

FACTORY AUTHORIZED SERVICE AVAILABLE IN TELEVISION AREAS

\$44.95 Will Put This Luxurious
**NEW 1951 MIDWEST VIDEO
GRAND 19½" TELEVISION**
Console with AM-FM Radio and New 3-Speed Automatic
Intermix Phonograph In Your Own Home On 30 DAYS TRIAL
You Must Be Satisfied or YOUR MONEY BACK

MIDWEST Offers A Complete Line Of 19½-Inch and 16½-Inch TELEVISION Models



MIDWEST "CONSTELLATION" TELEVISION CONSOLE with GIANT 16½-Inch PICTURE

Another sensational Midwest Television value! A powerful BIG-PICTURE receiver in a strikingly beautiful Console Cabinet, provides 151 square inches of bright, clear, steady picture.

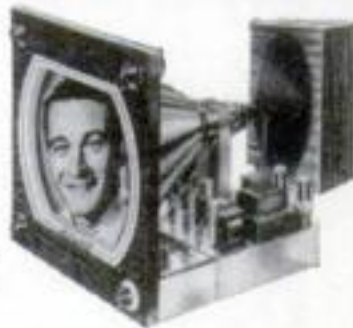
"CONSTELLATION" 19½-Inch Picture Tube TELEVISION CONSOLE

The most sensational buy on the market today. Only \$29.99 will put this mammoth 225 square-inch picture TV Console in your home on 30 Days Trial.



Complete 19½-Inch TELEVISION CHASSIS

Ready For Custom Installation In Your Own Cabinet. Just plug in, hear and view.



COMPLETE 16½-Inch TELEVISION CHASSIS

Ready for custom installation in your own cabinet. Just plug in, hear and view.



"VIDEO GRAND" TELEVISION-RADIO- PHONOGRAPH with GIANT 16½-Inch Picture Tube

A magnificent combination offering 151 square-inch picture, AM-FM Radio and 3-Speed Automatic Intermix Phonograph.



...and TELEVISION Adapter CONSOLES and CHASSIS for Use with MIDWEST RADIOS

These units operate only in conjunction with the Television Audio Switch-Over of the 1948, 1949, 1950, and 1951 model Midwest Radios.

Get MORE For Your RADIO and TELEVISION DOLLAR . . . BUY DIRECT From

... Also Powerful New World-Ranging 5-Band
1951 MIDWEST ^{Series 16} **RADIOS**

In Beautiful Consoles
 and Complete Chassis
FACTORY-TO-YOU



**EASY
TERMS**

Again, as for the past 31 years, Midwest brings you the absolute tops in radio engineering and performance in its new 1951 Radio Line featuring the magnificent SYMPHONY GRAND Radio-Phonograph Combination with the powerful 5 Wave Band Series 16 AM-FM Radio Chassis and the 3-Speed Automatic Intermix Phonograph that plays all makes of records.



**30 DAYS
TRIAL**

Read What These Satisfied MIDWEST Owners Say:

"My Midwest Television Tops Them All"



Chicago, Ill.—I have given my new Midwest Video Grand Television-Radio Combination a thorough test and it has come through with flying colors. From the rich looking cabinet, the excellent AM and FM radio reception, to the perfect television picture. My Midwest tops them all. We are proud to own a Midwest Television.
 Eric A. Krohnert
 3135 N. St. Louis Ave.

"Midwest Is The Most In Radio For The Least Price"

Springfield, Mass.—To your potential customers I say this: Ask the man who owns one—and I'll answer for every Midwest Radio owner that Midwest is the most in radio for the least price.

Roy J. Harrington
 104 Shattuck St.

"The Most Wonderful Tone You Could Ask For"

Detroit, Mich.—I am very well satisfied with my Midwest Symphony Grand Radio-Phonograph that I purchased from your factory more than a year ago. It has the most wonderful tone you could ask for and all my friends envy me for having such a wonderful set.

Donald Pfeiffer
 6219 Baldwin Ave.

"Better Than Sets Costing Twice As Much"

St. Albans, N.Y.—Our friends criticized us for ordering a Midwest Television by mail but when they saw our Video Grand they gasped in amazement at its perfection of tone and fine clear pictures. They tell us now that our Midwest is better than sets costing twice as much.

Frederick J. Willis
 114-17—21st St.

"Amazed At The Precision Picture Control"



Santa Ana, Calif.—I wish to take this opportunity to heartily recommend the Midwest "Constellation" Television receiver which I purchased from you. My friends who see my Midwest Television are amazed at the precision picture control it provides. They are even more surprised at the price, which they usually guess is double the amount I paid.

L. C. Bullock
 832 Cypress St.

"Brings In London, England, Easily"

Hot Springs, Ark.—I received my new Midwest Series 16 Radio and I am certainly well pleased with it. It brings in London, England, easily as well as Canadian and other faraway stations. I have other different makes but my Midwest is the best of all. Thanks for making such good radios.

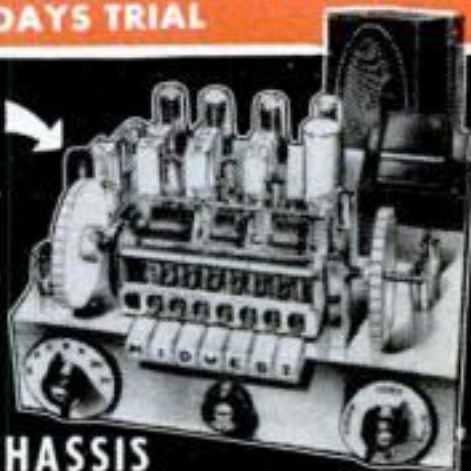
W. M. Street
 Crystal Route 270

\$24⁰⁰

Will Put This Beautiful
1951 SYMPHONY GRAND
 Radio-Phonograph In Your Own Home
 On 30 DAYS TRIAL

\$10⁹⁵
 DOWN

**MIDWEST
 SERIES 16
 5 WAVE
 BAND
 RADIO CHASSIS**



—the same as is used in the SYMPHONY GRAND Combination, is also available for custom installation in your own cabinet. Low Factory Price...30 Days Trial.

• WRITE IN NAME AND ADDRESS (PLEASE PRINT) ON COUPON OR 1c POSTCARD •

MIDWEST RADIO & TELEVISION CORP.
 Dept. 24A, 909 BROADWAY • CINCINNATI 2, OHIO

Please send me your new FREE 1951 Catalog.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

SEND COUPON TODAY
 For This NEW 1951

4 COLOR
Free MIDWEST
 RADIO & TELEVISION
 CATALOG



MIDWEST RADIO & TELEVISION CORP.
 DEPT. 24A, 909 BROADWAY, CINCINNATI 2, OHIO

AUGUST 1950 |

Perry Githens, EDITOR

Fred O. Newman, Volta Torrey, MANAGING EDITORS Howard C. Jensen, ART EDITOR

Harry Walton, MECHANICS & HANDICRAFT EDITOR

Hartley E. Howe, Frank Rowsome, Jr., ASSISTANT MANAGING EDITORS

ASSOCIATE EDITORS: Howard Allaway, Alden P. Armagnac, Devon Francis, Richard Giovine, Robert Gorman, Sheldon Gallager, Herbert Johansen, Martin Mann, Denis Sneigr, Robert P. Stevenson.

ART DIRECTOR: Harry Samuels. ART ASSOCIATES: Herbert Anthony, Eric Karminski, Jr., Richard Meyer, Edward Hallstrom, Frances Cooper (Production).

EDITORIAL ASSISTANTS: Julia Charnif, Carol Ennis, Rita K. Gilbert, Georgette Sparks, Harriet Trowbridge, Ruth Westphal.

STAFF PHOTOGRAPHERS: W. W. Morris (Chief), Hubert Luckett, Orlando Guerra (Darkroom).

WESTERN EDITOR: Andrew R. Boone (Los Angeles).

WASHINGTON EDITOR: John F. Loosbrock.

Features FOR AUGUST, 1950

Super-Movies Put You in Show.... 74

Three projectors and six sound tracks wrap you in realistic sight and sound.

Ship-Launched Viking Rocket..... 84

Rising from the deck of a ship in mid-Pacific, a 50-foot Navy rocket soars to a record height.

Typewriter "Sets Type" on Film.... 93

Will this machine-with-a-memory be the biggest thing in printing since Gutenberg's bright idea?

Diver Battles Shark.....100

Don't take a poke at a shark—unless you are willing to bet your life you can outfight him.

TV for Everybody.....111

UHF slave station in Connecticut shows how your town could get big-city television.

Road Race Tests Cars and Men....116

Slithering around a highway loop, agile sports cars compete in a revival of early races.

Sun Furnace for Hottest Heat.....122

French scientists use an antiaircraft searchlight mirror to bring the sun down to earth.

Fix Your Roof Yourself.....151

Rain on the roof is pleasant—when it doesn't come in. Here are the tricks of tracing leaks.

New Furniture from Old.....158

Secondhand pieces are often sound, comparatively cheap—and ugly. But a fast refinish fixes that.

Gus and the Miracle Jeep.....162

Gus looks into the case of the engine that runs just as well under water as it does on top.

We Built a Family Theater.....174

When the cabinets multiplied like rabbits, this fellow called a halt, produced a supercabinet.

Manual Training for Housewives..201

School teaches New York goodwives to patch plaster, fix fuses, do what their husbands are too lazy to.

Renault Engine Easy to Get At..... 90

Film Package Is Camera..... 98

Undersea Pipe Taps Tanker's Oil..... 99

Models Show Way to Hide Antennas....105

One-Armed Robot for Hot Jobs.....106

Godfrey Hammond, PUBLISHER · Stephen P. Glennon, ADVERTISING DIRECTOR · Edward Roeder, Jr., ADVERTISING MGR.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y. Manuscripts and illustrations submitted at regular rates should be so marked, addressed to "The Editors" and accompanied by stamped, self-addressed envelope. Popular Science Monthly exercises all possible care but assumes no responsibility for unsolicited material.

ADVERTISING OFFICES: NEW YORK — 353 Fourth Avenue; CHICAGO—360 North Michigan Avenue; DETROIT —820 Book Building; SAN FRANCISCO—1003 TWA Building; PORTLAND (ORE.)—907 Terminal Sales Building; CLEVELAND—328 Citizens Building; LOS ANGELES — Granada Building.

Popular Science Monthly is published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Raymond J. Brown, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright, 1950, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, \$3.00 (2 years, \$5.50; 3 years, \$7.50); foreign countries \$1 per year extra. Subscribers must notify us of change of address four weeks before next publication date. Be sure to give both old and new addresses, including zone numbers. Vol. 157, No. 2.

A tale of two Texans



J. R. TODD of Crane, Texas, has this to say about his I. C. S. Course in Certified Public Accounting:

“ My I. C. S. training is really paying off. Already, I'm netting \$120 a month profit on my investment—with more to come. Dividends like these are convincing proof of the value of I. C. S. training. ”



H. A. HOWELL of Big Spring, Texas, completed the I. C. S. Course in Architectural Drawing, is currently enrolled in the Complete Architectural Course. He writes:

“ I got my present job on the strength of my I. C. S. training. As a result, I'm \$100 a month richer. You can see why I'm so sold on I. C. S. ”

Few investments pay you as well as the time and money you spend preparing yourself for advancement. I. C. S. records offer convincing proof of this fact. Each year, I. C. S. receives more than 1500 letters from students reporting salary increases and promotions.

What they are doing, you can do. And now's the time to start. Your first step: marking and mailing the coupon. It brings you a wealth of information about the career that interests you.

INTERNATIONAL CORRESPONDENCE SCHOOLS

APPROVED
under the
G.I. BILL

BOX 7659-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

- | | | | | | |
|---|---|--|---|--|---|
| Air Conditioning and Plumbing Courses
<input type="checkbox"/> Air Conditioning
<input type="checkbox"/> Heating
<input type="checkbox"/> Refrigeration
<input type="checkbox"/> Plumbing
<input type="checkbox"/> Steam Fitting
Chemical Courses
<input type="checkbox"/> Chemical Engineering
<input type="checkbox"/> Chemistry, Analytical
<input type="checkbox"/> Chemistry, Industrial
<input type="checkbox"/> Chemistry, Mfg. Iron & Steel
<input type="checkbox"/> Petroleum Refining
<input type="checkbox"/> Pulp and Paper Making
<input type="checkbox"/> Plastics
Civil Engineering, Architectural and Mining Courses
<input type="checkbox"/> Architecture
<input type="checkbox"/> Architectural Drafting
<input type="checkbox"/> Bridge and Building Foreman
<input type="checkbox"/> Building Estimating
<input type="checkbox"/> Civil Engineering
<input type="checkbox"/> Coal Mining
<input type="checkbox"/> Contracting and Building
<input type="checkbox"/> Highway Engineering
<input type="checkbox"/> Lumber Dealer
<input type="checkbox"/> Reading Structural Blueprints
<input type="checkbox"/> Sanitary Engineering
<input type="checkbox"/> Structural Drafting | <input type="checkbox"/> Structural Engineering
<input type="checkbox"/> Surveying and Mapping
Communications Courses
<input type="checkbox"/> Electronics
<input type="checkbox"/> Practical Telephony
<input type="checkbox"/> Radio, General
<input type="checkbox"/> Radio Operating
<input type="checkbox"/> Radio Servicing
<input type="checkbox"/> Television
<input type="checkbox"/> Telegraph Engineering
Electrical Courses
<input type="checkbox"/> Electrical Drafting
<input type="checkbox"/> Electrical Engineering
<input type="checkbox"/> Electric Light and Power
<input type="checkbox"/> Lighting Technician
<input type="checkbox"/> Practical Electrician
Internal Combustion Engines Courses
<input type="checkbox"/> Auto Technician
<input type="checkbox"/> Diesel-Electric
<input type="checkbox"/> Diesel Engines
<input type="checkbox"/> Gas Engines
Mechanical Courses
<input type="checkbox"/> Aeronautical Engineer's, Jr.
<input type="checkbox"/> Aircraft Drafting
<input type="checkbox"/> Forging
<input type="checkbox"/> Heat Treatment of Metals
<input type="checkbox"/> Industrial Engineering
<input type="checkbox"/> Industrial Instrumentation | <input type="checkbox"/> Industrial Metallurgy
<input type="checkbox"/> Machine Shop
<input type="checkbox"/> Mechanical Engineering
<input type="checkbox"/> Mold-Loft Work
<input type="checkbox"/> Patternmaking—Wood, Metal
<input type="checkbox"/> Reading Shop Blueprints
<input type="checkbox"/> Sheet-Metal Drafting
<input type="checkbox"/> Sheet-Metal Worker
<input type="checkbox"/> Ship Drafting
<input type="checkbox"/> Tool Designing
<input type="checkbox"/> Welding Engineering
<input type="checkbox"/> Welding—Gas and Electric
Railroad Courses
<input type="checkbox"/> Air Brake
<input type="checkbox"/> Diesel Locomotive
<input type="checkbox"/> Locomotive Engineer
<input type="checkbox"/> Locomotive Fireman
<input type="checkbox"/> Locomotive Machinist
<input type="checkbox"/> Railroad Section Foreman
<input type="checkbox"/> Steam-Diesel Loco. Eng.
Stationary Eng'r's Courses
<input type="checkbox"/> Boilermaking
<input type="checkbox"/> Combustion Engineering
<input type="checkbox"/> Engine Running
<input type="checkbox"/> Marine Engineering
<input type="checkbox"/> Power Plant Eng'r's | <input type="checkbox"/> Mech. Drafting
<input type="checkbox"/> Ship Fitting
<input type="checkbox"/> Toolmaking
<input type="checkbox"/> Car Inspector
<input type="checkbox"/> Steam Engr. | Textile Courses
<input type="checkbox"/> Cotton Manufacturing
<input type="checkbox"/> Loom Fixing
<input type="checkbox"/> Textile Designing
<input type="checkbox"/> Rayon Weaving
<input type="checkbox"/> Woolen Manufacturing
Business and Academic Courses
<input type="checkbox"/> Accounting
<input type="checkbox"/> App. Psychology
<input type="checkbox"/> Business Administration
<input type="checkbox"/> Bus. Correspondence
<input type="checkbox"/> Certified Public Accounting
<input type="checkbox"/> Commercial
<input type="checkbox"/> Cost Accounting
<input type="checkbox"/> Federal Tax
<input type="checkbox"/> Foremanship
<input type="checkbox"/> Good English
<input type="checkbox"/> Higher Mathematics
<input type="checkbox"/> Industrial Supervision
<input type="checkbox"/> Motor Traffic
<input type="checkbox"/> Retailing
<input type="checkbox"/> Salesmanship
<input type="checkbox"/> Sign Lettering
<input type="checkbox"/> Spanish
<input type="checkbox"/> Traffic Management | <input type="checkbox"/> Advertising
<input type="checkbox"/> Bookkeeping
<input type="checkbox"/> Bus. Law
<input type="checkbox"/> Commercial Art
<input type="checkbox"/> First Year College
<input type="checkbox"/> French
<input type="checkbox"/> High School
<input type="checkbox"/> Illustration
<input type="checkbox"/> Postal Civil Service
<input type="checkbox"/> Retail Bus. Management
<input type="checkbox"/> Secretarial
<input type="checkbox"/> Stenography |
|---|---|--|---|--|---|

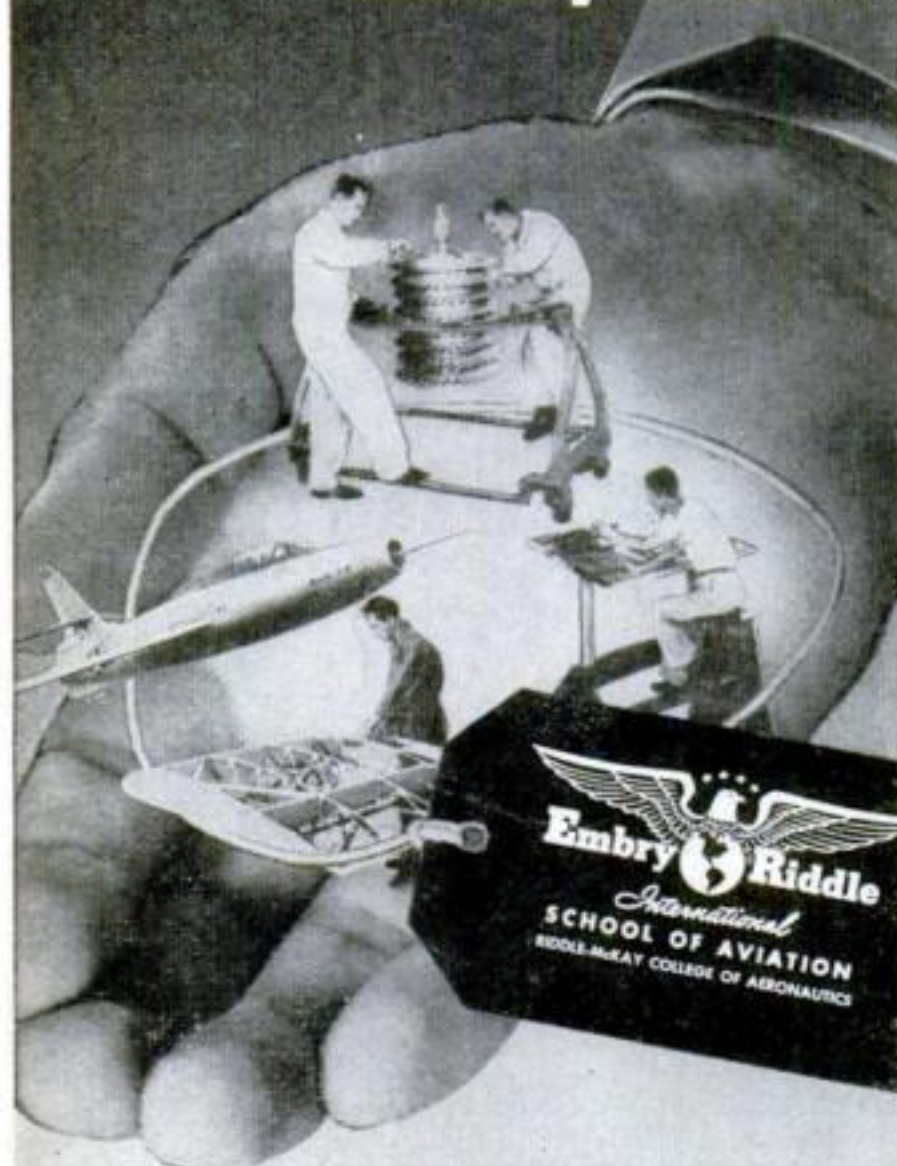
Name _____ Age _____ Home Address _____

City _____ State _____ Working Hours _____ A.M. to _____ P.M.

Present Position _____ Employed by _____

Length of Service in World War II _____ Enrollment under G.I. Bill approved for World War II Veterans. Special tuition rates to members of the Armed Forces. Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

Your Success in Aviation begins at Embry-Riddle



There's a bright future ahead for you in Aviation. In fact, no other career field today can possibly offer you so much opportunity. The aviation industry urgently needs men with skilled minds and hands to build, fly and maintain the giant aircraft of this great new Air Age.

The properly trained man climbs faster and higher in Aviation, just as in any other profession. That's why we say *your aviation success begins at Embry-Riddle*. For Embry-Riddle offers you the matchless advantage of knowledge and experience gained over a quarter-century of specialized aviation training.

In a few short months Embry-Riddle prepares you for engineering, master mechanic, flight or combined pilot and mechanic positions. All courses stress *thorough, practical* study including work on *live* aircraft in Embry-Riddle's airline-size hangars.

Enjoy Florida's unexcelled year-'round climate, its wealth of aviation and recreational facilities. Live, work and play on Embry-Riddle's modern campus — the most complete aviation school plant in America. Save time, earn good money faster...send coupon *today* for full information.

Dean of Enrollments - Dept. 93
Embry-Riddle School of Aviation
Miami 30, Florida

Please Print

NAME _____

ADDRESS _____

City _____

State _____ Age _____

I am interested in...

- ☐ A.&E. Mechanic
- ☐ Commercial Pilot
- ☐ Engineering
- ☐ A.&E. Combined Commercial Pilot
- ☐ Flying Mechanic
- ☐ Drafting & Design

Check One ☐ Veteran ☐ Non-Vet

TRAIN IN MIAMI—AIR CAPITAL OF THE WORLD

How a Coaster Brake Stops a Bike.....	108
World's Biggest Color Photo.....	129
53 Million Tin Cans Every Day.....	132
Plastic Road Rolled Out.....	134
Obstacles Test Fork Drivers.....	140
What It Takes to Drill a Well.....	142
Autos Race in Your Back Yard.....	145
Boxcar Gives "Pullman" Ride.....	148

Mechanics & Handicraft

Sink Cabinet Adds Storage Space.....	156
Ignition Timing Light for a Dollar.....	167
We Mow Our Lawn with an Outboard..	169
Folding Stool Saves Space.....	172
TV's Images Can Be Photographed.....	184
Twin-Image Cap Sharpens Photos.....	187
Repair That Broken Blind Yourself.....	191
Hose Unwinds While the Water Runs....	193
Quick Milling Setups for Your Lathe....	196
A Flying Wing You Can Build.....	204
Back-Seat Box Satisfies Dog.....	206
How to Repair Your Own Rugs.....	210
How to Make a Windshield Washer.....	215

Departments

Letters	8
New Ideas from the Inventors.....	79
Aids to Modern Living.....	130
Keeping the Home Shipshape.....	137
Hints from the Model Garage.....	165
Built by PS Readers.....	173
What's Wrong?.....	183
New Shop Ideas.....	188
I'd Like to See Them Make.....	190
Mechanics of Farming.....	226
New Tools.....	242
P.S. Last Minute News and Notes.....	246

Keeping a TV Photo-Scrapbook

NOTHING has as short a life expectancy as a TV image; even soap bubbles live long in comparison. If you've ever wondered how to preserve these evanescent flickers in your living room, take a look at the article on page 184. It tells how you can capture a permanent record of the memorable scenes that flash in over the air waves.

What's **NEW**
in Batteries?

AUTO-LITE **Sta-ful** BATTERY... *needs water* *only 3 times a year*

IN NORMAL CAR USE

A revolutionary new development, the Auto-Lite "Sta-ful" Battery, protects you against a major cause of battery failure . . . damage to plates due to liquid loss. This new "Sta-ful" Battery Design permits a liquid reservoir with more than 3 times the reserve capacity of ordinary batteries . . . keeps plates fully covered and active months longer in normal car use.

In addition, "Sta-ful" gives you 70% longer average life* than batteries without Sta-ful features. Fibre-glass retaining mats protect every positive plate and keep the power producing material in place for maximum dependability. Get more for your battery dollars—replace with an Auto-Lite "Sta-ful" Battery. See your Dealer today.

AUTO-LITE BATTERY CORPORATION

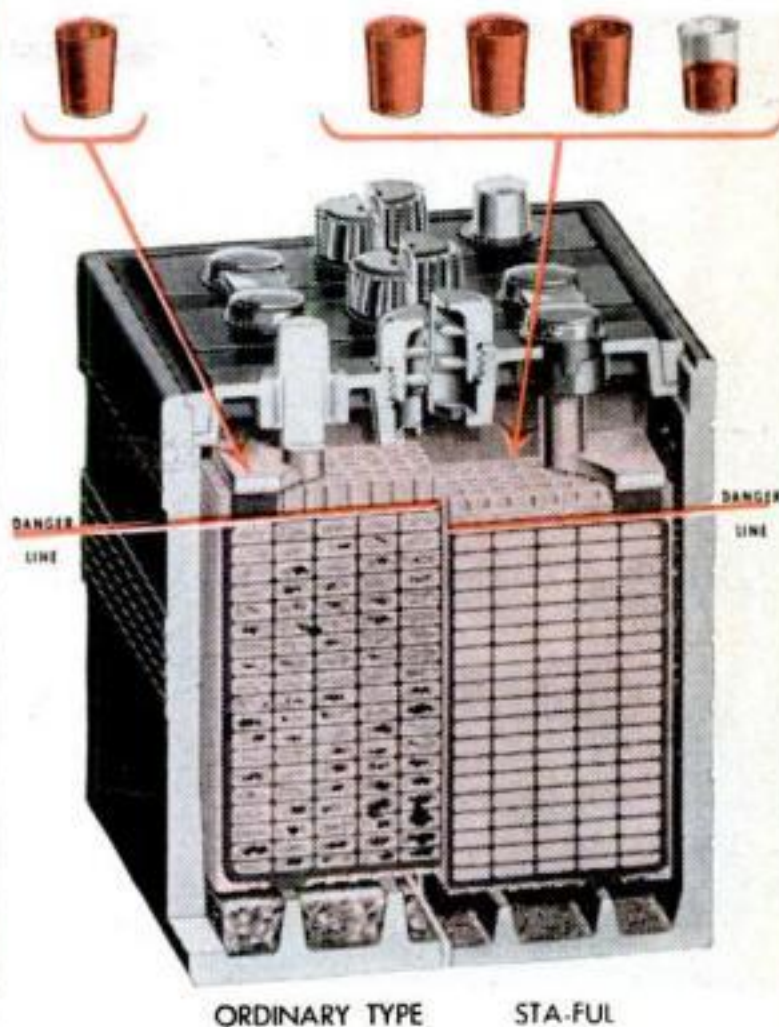
Toledo 1

Ohio

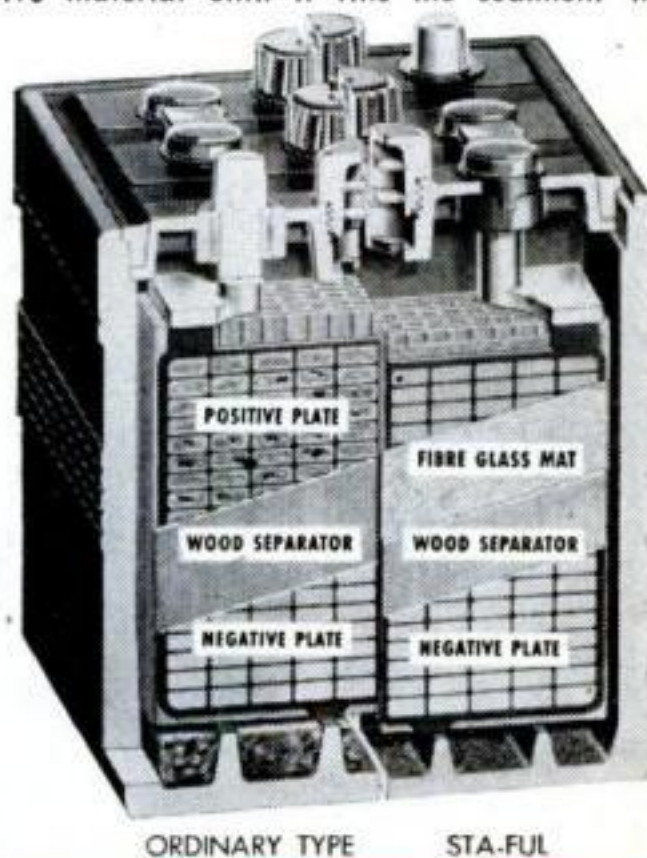


*Proven by tests conducted according to SAE Life Cycle Standards.

Because of its unique design and construction, the new Auto-Lite "Sta-ful" Battery holds more than 3 times the liquid reserve of ordinary batteries.

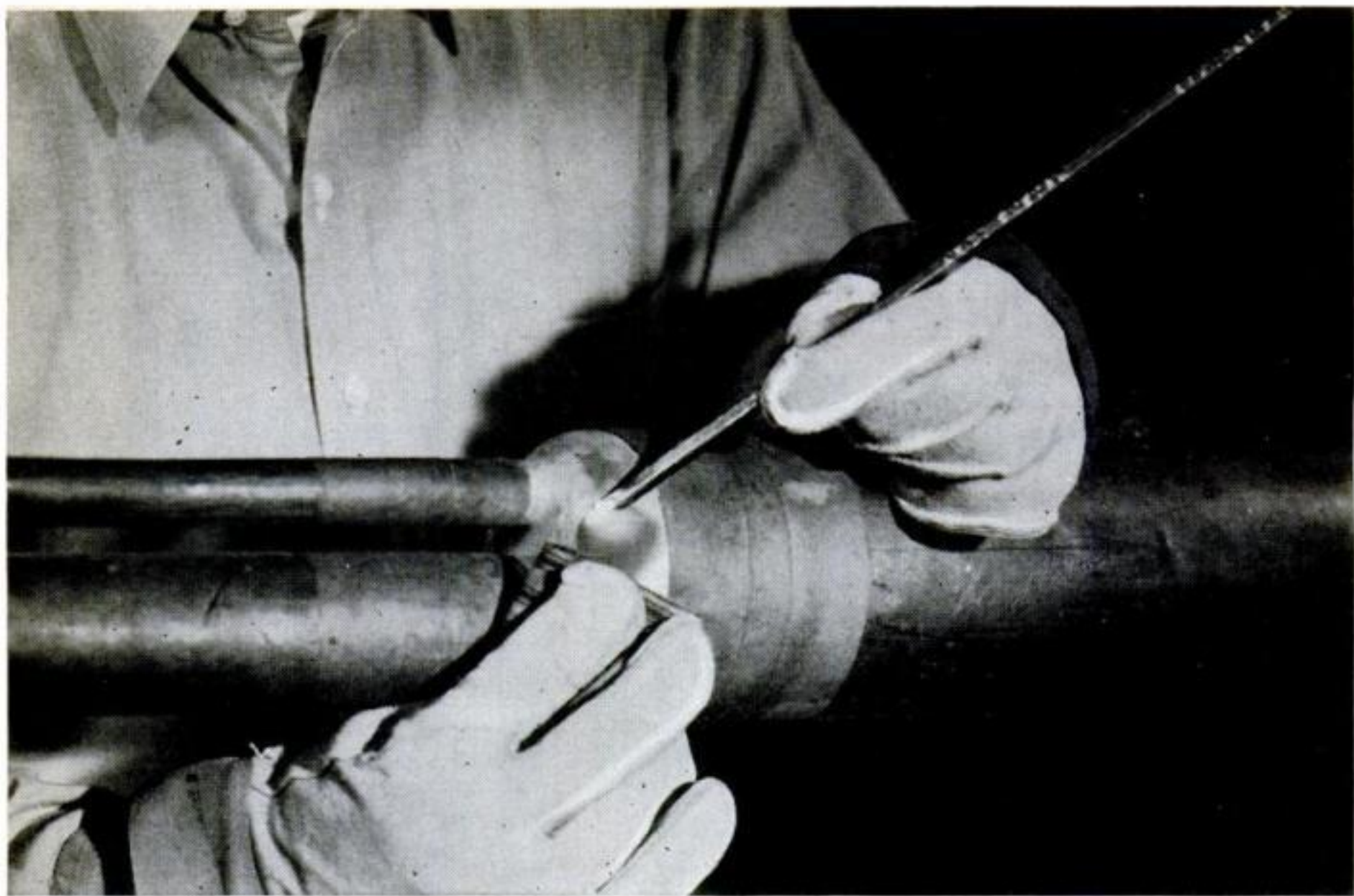


Note how the protective Fibre-glass mat retains the power-producing material in the positive plate while ordinary battery plates shed the active material until it fills the sediment well.



AUTO-LITE

Sta-ful BATTERIES



*He seals out
trouble...*

**TO KEEP THE COST
OF YOUR TELEPHONE
SERVICE DOWN**

To make cable joints tight and strong, splicers formerly used lots of solder. Then, Bell Telephone Laboratories developed a new technique for making better joints with much less solder. This saves one million pounds of solder a year — helps keep the price of your telephone service low.

Two kinds of solder are now used. One makes the splice strong; the other seals it. First, the splicer builds up a joint with a solder of lead and tin, which flows easily under his wiping cloth. To seal the joint, he applies a light coating of low-melting-point solder, composed of lead, tin and bismuth. On contact with the still hot joint, it flows into and seals every pore.

Cable-sealing solder is only one of 30 low-melting-point alloys which Bell metallurgists have developed for special uses — in fuse wires, for example, and in the solder connecting hair-like wires to piezoelectric crystals for electric wave filters.

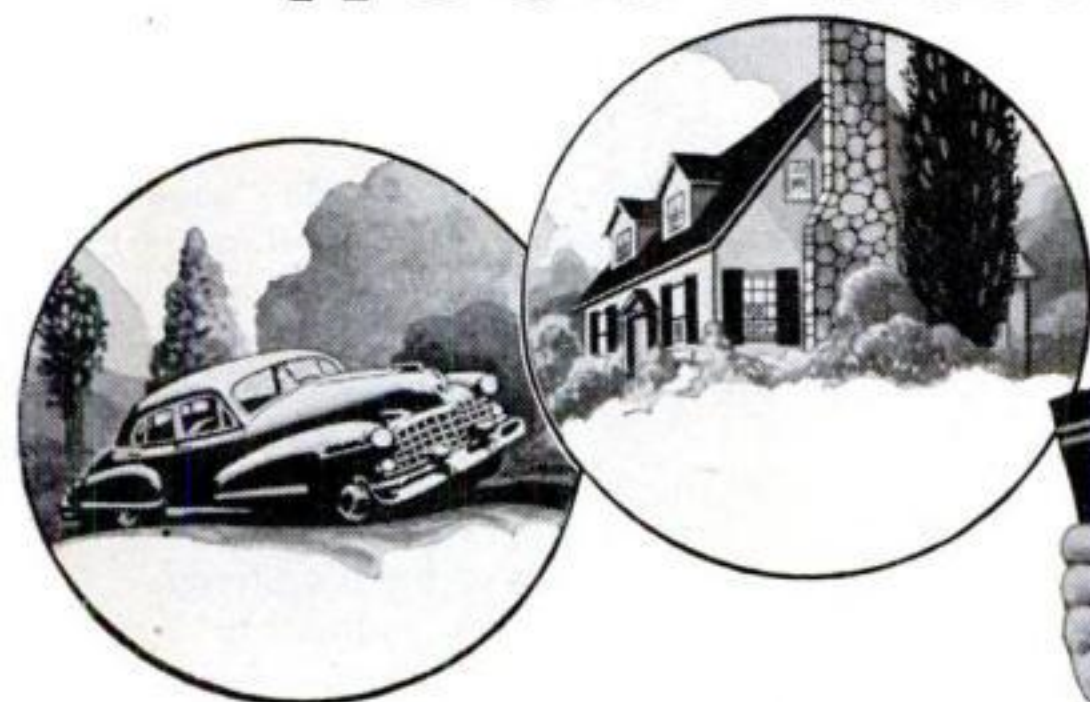
Continuing research with a substance seemingly as commonplace as solder demonstrates again how Bell scientists help keep your telephone service the world's best.

BELL TELEPHONE LABORATORIES



• **WORKING CONTINUALLY TO KEEP YOUR TELEPHONE
SERVICE BIG IN VALUE AND LOW IN COST**

5 reasons why ACCOUNTANCY



offers you MORE MONEY... and SUCCESS!

REASON #1. If you were an expert accountant right now, chances are you would find yourself among the highest-paid of all professional men and women. Even back in "depression years," surveys showed that accountants earned more on the average than men in other major professions.

REASON #2. The demand for accountants is great—everywhere. All businesses must have trained accountants to cope with ever-growing requirements. It's a profession offering wide opportunity—always—to the man who knows.

REASON #3. You can fit into any business, anywhere in the country—because accounting principles are universal. Think what this means in terms of security and independence!

REASON #4. Accountancy is open to all. Any man or woman of good intelligence, who enjoys figure work and is willing to follow LaSalle's systematic "problem method" plan, can rapidly qualify for a highly profitable, enjoyable

lifetime career... and he doesn't have to finish his training before beginning to "cash in."

REASON #5. Without losing a day from your present work, you can prepare in spare hours at home, at low cost, under LaSalle's step-by-step "Problem Method" of "learning by doing." This famous plan accounts for LaSalle's remarkable record of having trained nearly 10 per cent of all Certified Public Accountants in the U. S. . . . and of having put many thousands of others into high-paying careers.

Send today for LaSalle's interesting booklets, "Accountancy, the Profession That Pays," and "Success Reports." Learn about the five great fields of opportunity... and LaSalle's time-tested plan for helping men and women to rapid advancement, higher income, greater prestige and professional standing. The coupon below will bring these fact-filled booklets to you—without cost or obligation. Mail the coupon NOW.

Other LaSalle Opportunities

- ☐ C.P.A. Coaching
- ☐ Bookkeeping
- ☐ Law: LL.B. Degree
- ☐ Business Management
- ☐ Salesmanship
- ☐ Traffic Management
- ☐ Foremanship
- ☐ Industrial Management
- ☐ Stenotypy
- ☐ (Machine Shorthand)

LaSalle Extension University A Correspondence Institution

Dept. 883-HR 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, your 48-page illustrated book "Accountancy, the Profession That Pays," and the booklet "Success Reports"—send also "Ten Years' Promotion in One"—a book which has helped many men.

Name.....Age.....

Address.....

City, Zone, State.....

**LASALLE EXTENSION
UNIVERSITY**

417 S. Dearborn St., Chicago 5

AUGUST 1950 7



NEW 207
Diagonal
Plier



NEW 239
Wrench
Plier



NEW 250
Lock-Ring
Plier

Meet Mr. Plion and his large family of tough, top-quality PROTO* pliers.

Included are all common types, several specials and the NEW pliers illustrated. You'll roar with delight at their fine construction, superior design and other features. Choose the pliers you need from the quality "lion"—at your PROTO* dealer's. Write for catalog to

PLUMB TOOL COMPANY

2257V Santa Fe Ave.,
Los Angeles 54, Calif.

* **PROTO** means **PRO**fessional **TO**ols. It's the new name for the tools that have been preferred for 43 years.

5084



Letters



Out of the Frying Pan . . .

Sir:

In your June issue, in the article on "Turbo Cars" [p. 98], I read that gas-turbine engines, so high-powered for their size, will enable a trailer truck to carry a heavier load without increasing the length.

Then in *Reader's Digest* for the same month, in an article entitled "The Rape of Our Roads," I read that over-loaded trucks are already tearing up the nation's highways faster than we can replace them.

M. ELLIS LINSEY

Seguin, Texas

Needed: cheaper ways of building tougher roads. For one possible approach, see p. 134.

How to Keep the Dust Out

Sir:

About your suggestion in April, p. 184, for using abrasives to adjust tappets: Wouldn't the abrasive dust find its way



into the bearings and other parts of the engine, resulting in a major repair bill?

HERMAN M. RENTZ

Woodruff, S. C.

The garageman who made the suggestion says he took it for granted that any mechanic would know this must be prevented. Commonest method of control is to pack rags around work area, and remove grit by careful, moderate blasts from the air hose.

Silencer for Power Tools

Sir:

The article on "Soundproofing Your Shop"

MORE SHOTGUN FOR YOUR DOLLAR

STEVENS MODEL 311

Double Barrel Shotgun
12, 16, 20 and .410 gauge

STEVENS MODEL 94

Single Barrel Shotgun
12, 16, 20 and .410 gauge



Two-way, top snap action for *either* right or left hand shooters, is a feature of the Stevens Model 94 "single." Lock-up is positive and rigid — can't shoot loose. Unbreakable coil springs . . . chrome molybdenum firing pins and *positive automatic* ejector are other quality features.

You get more shotgun for your dollar, *plus* more fine gun features, when you buy a Stevens double or single barrel shotgun. That statement has been proved by the tens of thousands of shooters, over the years, who have made these guns their first choice. And, by the fact that Savage is the world's largest builder of single and double barrel shotguns.

Plan right now to own a Stevens "double" or "single" this year — for pest and sports shooting. See these "first in the field" values at your dealer's. *Write for free catalog describing the complete line of Savage, Stevens and Fox Shotguns and Rifles.*

SAVAGE ARMS CORPORATION
Firearms Division, Chicopee Falls, Mass.



There's no better, more reliable double barrel shotgun action, *regardless* of price than in the Stevens Model 311 "double." The coil spring-hammer-sear mechanism of proven design (used in most expensive double guns) gives clean, crisp, trigger pulls — split second hammer fall.

STOCKS — New redesigned wood stocks and fore-ends, walnut finish, on both Model 94 and 311.



Barrel and Lug forged in one piece — one of many fine gun features found in these low priced Stevens models . . . features which mean unfailing dependability . . . top shooting qualities.

MORE FINE GUN FEATURES



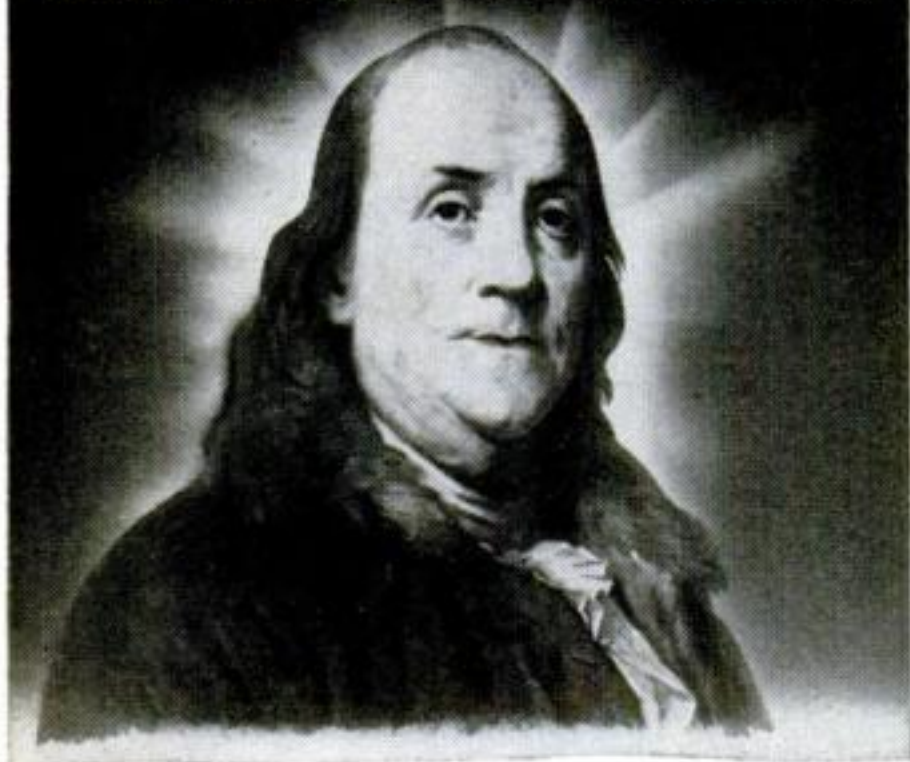
SAVAGE

SAVAGE • STEVENS • FOX Rifles and Shotguns

SAVAGE • WORCESTER Power and Hand Lawn Mowers

AUGUST 1950 9

WHAT SECRET POWER DID THIS MAN POSSESS?

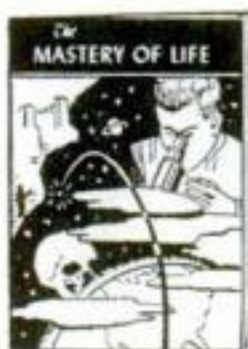


BENJAMIN FRANKLIN
(A Rosicrucian)

WHY was this man great? How does anyone—man or woman—achieve greatness? Is it not by mastery of the powers within ourselves? Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the secrets of a full and peaceful life!

Benjamin Franklin—like many other learned and great men and women—was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694. Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"—TODAY. No obligation. No salesmen. A non-profit organization. Address: Scribe T.L.M.

**THIS BOOK
FREE!**



The ROSICRUCIANS

SAN JOSE • (AMORC) • CALIFORNIA

—SEND THIS COUPON—

Scribe T.L.M.
The ROSICRUCIANS (AMORC)
San Jose, California
Please send me the free book, *The Mastery of Life*, which explains how I may learn to use my faculties and powers of mind.

Name _____

Address _____

City _____

[May, p. 196] brought to mind the use of car engine mounts for quieting power tools. I have seen this scheme used in mounting a spin dryer that was causing considerable vibration. These mounts made the dryer operate without a whisper. I am sure suitable mounts can be found for power tools that would quiet them at very little cost.

RALPH E. NEWPORT

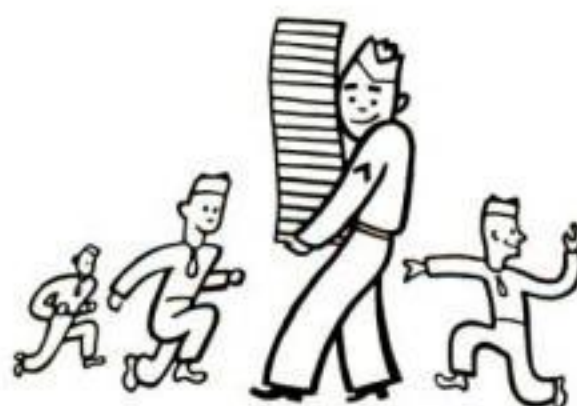
Amherst, Mass.

Back Issues of PS for GIs

Sir:

I'd like to volunteer to fill the request in your Letters department in June [p. 16] from S/Sgt. Henry A. Luke, stationed in Japan, for back issues of PS.

I have accumulated a great many, including some in the old large size of the early years. Sgt. Luke and his buddies at Yakota Air Force Base are welcome to any or all of them earlier than January 1949. This offer is open to any armed forces post



—but not to private individuals—that will provide transportation for them.

Don't misunderstand that I place no value on back issues—I do. But having also served in the Army, back in World War I days, I appreciate what a kick our boys get from magazines like yours.

FRANK D. MATLACK

252 Charles Ave.,
Port Richmond,
Staten Island 2, N.Y.

Another Tip on Used Cars

Sir:

You omitted one very important bit of advice from your article on selecting a used car [April, p. 188]. This is to check around the bottom of the doors and body for rusted-out places.

HENRY GRAF

Lancaster, Ohio

Badly rusted body metal is a good reason for

LEARN RADIO-TELEVISION

**PRACTICE AT HOME
IN SPARE TIME WITH THESE
AND OTHER RADIO KITS
I SEND YOU**



**I WILL TRAIN YOU AT HOME FOR
GOOD PAY-SUCCESS
A BRIGHT FUTURE**
in America's Fast Growing Industry



**J. E. SMITH, President
National Radio Institute**

I TRAINED THESE MEN



"Am doing Radio servicing full time. I have my own shop equipped with the best up-to-date instruments. Am making more money than I ever made before. I owe my success to N.R.I." — CURTIS STATH, Fort Madison, Iowa.



"I am employed by Station WKBO as transmitter operator. Have more than doubled salary since starting in Radio full time. Future looks bright. N.R.I. has been constant help to me." — ALBERT HERR, New Cumberland, Pennsylvania.

Do you want a good pay job, a bright future and security? Or your own profitable shop? Get into the fast growing, prosperous RADIO-TELEVISION Industry! Radio alone is bigger than ever! 81 million radios, 2,700 Broadcasting Stations, expanding Aviation, Police Radio, Micro-wave Relay, Two-way Radio are making opportunities for Servicing and Communications Technicians and FCC-Licensed Operators. Then add Television, TODAY'S good job maker. In 1949, almost 3,000,000 TV sets sold — 20,000,000 estimated in use by 1954. 100 TV Stations now operating and 1,000 predicted by authorities.

Many Soon Make \$10 Extra a Week in Spare Time

Keep your job while training at home. Hundreds I've trained are successful RADIO-TELEVISION TECHNICIANS. Learn Radio-Television principles from illustrated lessons. Get

PRACTICAL EXPERIENCE experimenting with circuits common to Radio and Television. Many students make \$5, \$10 a week extra fixing Radios in spare time. Special Booklets start teaching you the day you enroll.

Send Now for 2 Books FREE—Mail Coupon

Send for my FREE DOUBLE OFFER. Get actual Servicing lesson. Also get my 64-page book, "How to Be a Success in Radio-Television." Read what my graduates are doing, earning. Send coupon in envelope or paste on postal. J. E. SMITH, President, Dept. OHP-3 National Radio Institute, Washington 9, D. C.

The ABC's of SERVICING

How to Be a Success in RADIO- TELEVISION



Good for Both—FREE

**MR. J. E. SMITH, President, Dept. OHP-3
National Radio Institute, Washington 9, D. C.**

Mail me Sample Lesson and 64-page Book about How to Win Success in Radio-Television. Both FREE. (No Salesman will call. Please write plainly.)

Name..... Age.....

Address.....

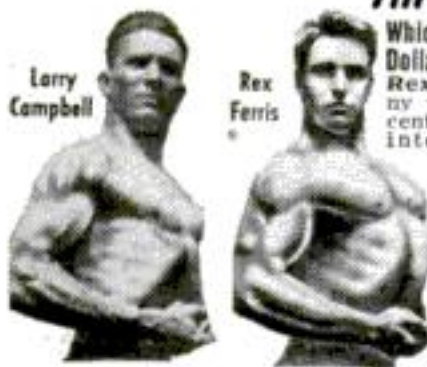
City..... Zone..... State.....

☐ Check if Veteran ☐ Approved Under G. I. Bill

VETERANS HURRY!

TO GET THIS VALUABLE TRAINING UNDER G. I. BILL.
TIME IS RUNNING OUT. MAIL COUPON NOW!

Which of these 2 one time WEAKLINGS PAID only a Few Cents to become an All-Around HE-MAN at Home?



Which One Paid Hundreds Of Dollars To Train At My Side? Rex Ferris, was a skinny weakling, paid a few cents to start building into a Champion All Around He Man! Larry Campbell paid me hundreds of dollars to train at my side years ago. Start to become an All-Around He Man at home with these same secrets for only a few cents—like Rex Ferris did!

Amazing get-acquainted offer—YOURS for only

10c

INSTEAD OF \$1 FOR ALL 5 COURSES Plus FREE Photo Book!

Be a Winner at Anything YOU Tackle with Progressive Power SPORTS! JOB! SCHOOL! FRIENDS!

Let's Go, Pal! I'll prove I can make YOU an

"ALL-AROUND" HE-MAN

FAST—OR NO COST! says George F. Jowett World's Greatest Body Builder



"The Jowett System is the greatest in the world!" says R. F. Kelly, Physical Director, Atlantic City

Enjoy My "Progressive Power" Strength Secrets! Give Me 10 Easy Minutes a Day—Without Strain!

I'll teach you the "Progressive Power Method" through which I rebuilt myself from a physical wreck the doctors condemned to die at 15, to the holder of more strength records than any other living athlete or teacher! "Progressive Power" has proven its ability to build the strongest, handsomest men in the world. And I stand ready to show you on a money back basis—that no matter how flabby or puny you are, I can do the same for you right in your own home. Let me prove I can add inches to your arms, broaden your shoulders, give you a man-sized chest, powerful legs and a rock-like back—in fact, power pack your whole body so quickly it will amaze you! Yes, I'll jam you with power and confidence to master any situation—to win popularity—and to get ahead on the job! Through my proven secrets I bring to life new power in you inside and out, until YOU are fully satisfied you are the man you want to be.

PROVE IT TO YOURSELF IN ONE NIGHT

Send only 10c for my 5 easy-to-follow, picture-packed courses now in 1 complete volume "How to Become a Muscular He-Man." Try it for one night! Experience the thrilling strength that surges through your muscles.

10 DAY TRIAL! Think of it—all 5 famous courses in one picture-packed muscle-building volume only 10c. You must actually FEEL results in ONE WEEK, or your money will be promptly refunded!

FREE!



FREE GIFT COUPON!



George F. Jowett Champion of Champions

Jowett Institute of Physical Culture Dept. PS-08 230 Fifth Avenue, New York 1, N. Y. Dear George:—Please send by return mail, prepaid, FREE Jowett's Photo Book of Strong Men, plus all 5 Muscle Building Courses, 1. Molding a Mighty Chest, 2. Molding a Mighty Arm, 3. Molding a Mighty Grip, 4. Molding a Mighty Back, 5. Molding Mighty Legs—Now all in One Volume "How to Become a Muscular He-Man." Enclosed find 10c for postage and handling. No C.O.D.'s.

Name.....Age..... Address..... City.....Zone & State.....

rejecting a car. But if the corrosion is not too bad, repairs are inexpensive.

No More Kurtis Kits

Sir:

Although the Kurtis-Kraft sports car described in your May issue, p. 136, has been in production for some time, your article told me a lot about it that I had never seen in print before. In fact, I always appreciate the way your articles say so much in so little space. But I want to call your attention to one slip in this one: The car is no longer available in build-it-yourself kits, but only as a production-line job.

F. THOMPSON HENKEL

Bloomfield Hills, Mich.

You are quite right. Kurtis abandoned kits between the time our article was written and the time it appeared in print.

How Tractor Clutch Works

Sir:

On page 211 of your May issue is a sketch showing the power train and clutch linkage for a midget tractor. Would you please explain how this clutch works, since the 10-tooth sprocket seems to be hooked to the engine shaft. The way I see it, then, the clutch isn't doing any good behind the main drive.

J. D. WILSON

Morristown, Tenn.

In this type of motor-scooter clutch, driving and driven members are coaxial—that is, power from the engine runs through a small central shaft to the clutch, then back through a rotating sleeve around the shaft. The 10-tooth sprocket is on the sleeve, not the inner shaft.

Oops!

Sir:

The cutaway view on page 101 of your June issue, in the article "Will We Drive Turbo Cars?", shows the centrifugal compressor revolving at 36,000 r.p.m. while the compressor turbine revolves at only 22,650 r.p.m. . . . I can find no break in the shaft . . .

PFC DALE W. HALL

Chanute Air Force Base, Ill.

There soon would be one! In labeling the

LEARN TELEVISION-RADIO OR ELECTRICITY

ON REAL EQUIPMENT
IN THE GREAT SHOPS
OF **COYNE**



TELEVISION-RADIO



NEW OPPORTUNITY FIELD

The tremendous growth of the new field of TELEVISION is almost unbelievable. New stations are springing up rapidly bringing television to millions of people in all parts of the country. Fast becoming one of the top industries. Unusual opportunity to get in on ground floor of this great opportunity field, Coyne offers practical-technical training in Television-Radio. Installation, testing, trouble shooting and service on Television, F-M and Radio equipment. Get big free book today.

Get into the OPPORTUNITY FIELD OF ELECTRICITY

For many years Electricity has been a most vital factor in industry. This great field will continue to grow and become more important. Thousands of trained Electrical men will be needed. Why be satisfied with a "no future" job? Prepare for a good job with a real future in Electricity.

Coyne Trained Men in Good Jobs

Thousands of Coyne trained men in good jobs or in a business of their own in Television-Radio and Electricity, make real money while others putter along. Yes, you can get ready for Good Pay—a Big Future—by training at COYNE here in Chicago. Here you work on real equipment—do actual wiring and trouble-shooting—get the practical-technical training you need.

Not "Home-Study"

We do not teach by mail. All training is given in our Great Training Shops in Chicago, plus necessary theory. Expert instructors guide you. No advanced education or previous experience needed.

GI Approved — Finance Plan for Non-Vets

COYNE courses are approved under the G.I. Bill. Non-veterans may enroll now, pay most of tuition later. If you need part-time work to help out with living expenses while at Coyne, we'll help you get it.

Mail Coupon for Big FREE BOOK

Whether you prefer Television-Radio, or Electricity, train on actual equipment, at Coyne. We have a big, fully illustrated book on each course, and we'll send you the one you want, or both, without obligation. Mail coupon — TODAY.

**B. W. COOKE, President
COYNE ELECTRICAL & TELEVISION-RADIO SCHOOL, 500 S. Paulina St., Chicago 12, Ill. Dept. CO-73H**



**B. W. COOKE, President
COYNE ELECTRICAL & TELEVISION-RADIO SCHOOL
500 S. Paulina St., Chicago 12
Dept. CO-73H**

Send FREE, the book checked below, and details of your training offer. This does not obligate me and no salesman will call.

☐ TELEVISION-RADIO ☐ ELECTRICITY

NAME.....

ADDRESS.....

CITY.....STATE.....



1 You are TOLD the how and why of each job.



2 You're shown how to do typical jobs by trained instructors.



3 You DO practical job YOURSELF on equipment.



**What's
your problem...**

NOT SATISFIED with YOUR PAY CHECK?

Home study training, in spare
time, can
increase your earnings!

The success of many of today's money-makers started in a coupon similar to the one below, which they checked, signed and mailed to AMERICAN SCHOOL. The information they received opened doors of real opportunity to promotions and bigger pay checks.

Who earns these rewards? It's the ambitious man with know-how and self-confidence which come from training. It's the man who looks far beyond the next pay day and sets his goal, and is willing to devote some of his spare time to acquiring the knowledge that will give him the power to climb the success ladder.

IT COSTS SO LITTLE — PROVIDES SO MUCH

At a cost you can afford and in hours you might otherwise waste you can prepare to climb in the field of work you prefer. American School, an educational institution organized *not for profit*, offers you a wide choice of training opportunities. Give serious thought to the list in the coupon, then check one or more subjects, add your name and address and mail it. You will receive full information, without obligation of any kind. Do it now.

AMERICAN SCHOOL
DEPT. GC-46, DREXEL AT 58th, CHICAGO 37

PRACTICAL, EFFECTIVE HOME - STUDY TRAINING SINCE 1897

Take This First Easy Step

CHECK, CLIP AND MAIL COUPON NOW

AMERICAN SCHOOL, Dept. GC-46, Drexel at 58th, Chicago 37, Ill.

Without obligation, please send me FREE information on training course checked below.

- | | | |
|---|--|--|
| <input type="checkbox"/> Accounting | <input type="checkbox"/> Business Mngmt. | <input type="checkbox"/> Plastics Engr. |
| <input type="checkbox"/> Air Conditioning | <input type="checkbox"/> Contracting | <input type="checkbox"/> Plumbing—Pract. |
| <input type="checkbox"/> Architecture & Building | <input type="checkbox"/> Diesel Engr. | <input type="checkbox"/> Private Secretary |
| <input type="checkbox"/> Automotive Engineering | <input type="checkbox"/> Drafting & Design | <input type="checkbox"/> Radio Operating & Servicing |
| <input type="checkbox"/> Aviation—Practical | <input type="checkbox"/> Electrical Engr. | <input type="checkbox"/> Railway Training |
| <input type="checkbox"/> Aviation Drafting & Design | <input type="checkbox"/> Electricity—Pract. | <input type="checkbox"/> Refrigeration |
| <input type="checkbox"/> Better Forem'nship | <input type="checkbox"/> Electronics, Indus. | <input type="checkbox"/> Sheet Metal |
| <input type="checkbox"/> Bookkeeping | <input type="checkbox"/> High School | <input type="checkbox"/> Pattern Drafting |
| | <input type="checkbox"/> Machine Shop | <input type="checkbox"/> Shop Management |
| | <input type="checkbox"/> Operations | <input type="checkbox"/> Tool Making |
| | <input type="checkbox"/> Mechanical Engr. | |

Name _____ Occupation _____

Address _____ Age _____

City & Zone _____ State _____

drawing, the 22,650 r.p.m. figure for the power-turbine was misapplied to the compressor turbine also. Being on the same shaft, compressor and compressor turbine rotate at the same speed—36,000 r.p.m.

Three-Minute Quiz

Sir:

Your June issue contains so much brain-stirring material that it will take me many hours of study to digest even part of it. How you get all of it within the covers seems just short of a miracle. On six points, however, I need a little help:

1. Page 140: What does M.G. stand for?
2. Page 141: If left-drive cars are available, why do you distract American readers with the English type?
3. Page 163: The retaining wall at the cinder-block home has no apparent weep holes. Are they not desirable?
4. Page 173: What about the paint burning off a coffee can used for baking a potato—won't it smell?
5. Page 174: Looks like that electric fan, placed under a wire basket to keep children's fingers out, should be secured to the board before the basket is.
6. Page 280: When thinking machines are built with a conscience, will there be crime among them as among men?

NOBLE E. PEELER

St. Paul, Minn.

1. The initials M.G. stand for Morris Garage, original name of the car's manufacturer, now known as the Nuffield Organization. In 1923, W. R. Morris—now Lord Nuffield—souped up several standard Morris Oxfords for use as racing cars. The design became popular, and the cars became a standard line under the name M.G.

2. Left-hand drives on the M.G. midget are available only on special order. At the time our photos of it were taken, the only new M.G.s in this country were all equipped with British right-hand drive.

3. The blocks in the wall were laid up dry—no mortar—so there is plenty of space between them for water to drain through.

4. First time the can is used the paint will smell.

5. The fan need not be secured to the board—any more than it needs to be screwed down on a table. Blades can't hit the basket, anyway, since the fan has a guard.

6. No comment.

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

02-H DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.

AUGUST 1950 **15**

You'd Never Guess I'm HARD of HEARING

"No Button
Shows in my
Ear"



"People don't notice I use a hearing aid. That is because I wear the new Beltone Phantomold. Thanks to this wonderful invention, NO BUTTON SHOWS IN MY EAR!"

The compact one-unit Beltone is so tiny—yet gives amazing clarity and power. The nearest thing to *natural* hearing. Get all the amazing facts about this electronic "miracle." Mail coupon today for valuable FREE booklet.



Beltone

MONO-PAC
One-Unit Hearing Aid

Beltone Hearing Aid Company, Dept. 326-B
1450 West 19th St., Chicago 8, Ill.

MAIL COUPON FOR FREE BOOKLET

Beltone Hearing Aid Company, Dept. 326-B
1450 West 19th Street, Chicago 8, Ill.

Please send me in a plain wrapper your FREE Booklet that tells how the deaf can HEAR AGAIN—without a button showing in the ear. No obligation.

Name

Address

Town..... State.....

STOP DENTAL PLATE DISCOMFORT The Way Dentists Do!

REMOVE:

- ✓ Mouth galling high spots
- ✓ Ulcerating rough areas
- ✓ Painful pin-point bumps

with the amazing new
DENTA-FILE

The Denta-File "home-aid," designed to help you gain instant relief when false teeth hurt, saves time and effort, unnecessary pain and expense. **STOP** embarrassing "plate whistle;" **STOP** using gooey fillers and liners; **STOP** ruining your dentures by scraping them with fingernail files, knives, etc. The filing tip of Denta-File—of the same quality abrasive used by many leading dentists—is permanently mounted in a handsome, gold-finished holder that is easily carried in pocket or purse. Simple, fully illustrated instructions enclosed. Full 30 day money back guarantee if not entirely satisfied.

Only \$2.00 postpaid. Postage charged on C. O. D. orders.

DENTA-FILE COMPANY Dept. S-8
350 West Washington Boulevard • Venice, California



Patent Pending
1/2 Actual Size

The New TEETER GLIDER

A swing and teeter-totter combined!

HEALTHFUL AND SAFE

—one or two children can play on it. It's now replacing the old style swings on playgrounds everywhere. Swings back and forth with a rowing motion such as a teeter-totter. Scientifically designed to develop every muscle in the body.



The Teeter Glider is a beautiful accessory for any home or playground and can be easily assembled. Universal mounting permits installation in any doorway, garage, basement or from any beam. It is adjustable to ANY height from the ground.

Made entirely of safe, longer lasting, rust-resistant steel and operates smoothly on 4 oiled-for-life bearings.

SAFETY FEATURES:

1. Seats remain level at all times (Less chance of falling).
2. Steel beams support swing (Will not break).
3. Foot and hand supports for children.
4. Constructed with nothing to pinch or catch clothes.

Price \$14.95

F.O.B. Shipping Wt. ONLY 35 pounds.
Los Angeles Send \$3 deposit on C.O.D. orders

JAMISON MANUFACTURING COMPANY

Dept. P-8, 8800 So. Mettler St., Los Angeles 3, California

LEARN TO HYPNOTIZE



Yes, anyone. Modern speed hypnotism. Methods revealed. You are shown exactly what to say and do. Many interesting experiments. Self-hypnosis is fully explained. Amazing results. Detailed hypnotic tests given. Learn this exciting fascinating art. Hold your friends spellbound. Have fun.

Send for "HYPNOTISM REVEALED" → \$1

12" Phonograph Record Inducing Self-Hypnosis plus Individual & Group-Hypnotism \$5

MELVIN POWERS, Professional Hypnotist, 1324 Wilshire, Dept. 70, Hollywood 17, Calif.

LEARN IN SPARE TIME— by Easy PICTURE CARTOONING CHART METHOD!

Same Simplified Method that has helped train creators of "Steve Canyon," "Winnie Winkle," "Out Our Way," "Secret Agent X-9," "The Neighbors," "Reg'lar Fellers," "Strange As It Seems," and many others. Send 10c for Picture Chart (to test your ability), and full details. (State age.)

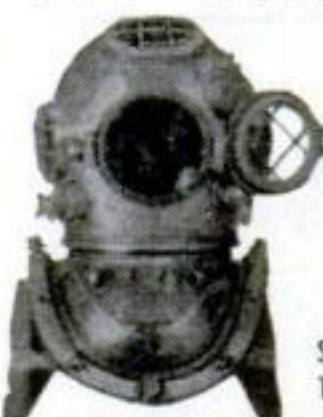
LONDON SCHOOL OF CARTOONING
5028 Cleve. Transit Bldg., Cleveland 14, Ohio



Learn RADIO TELEVISION ELECTRONICS

Train at home, in spare time, for a good pay job or a business of your own without capital—through our proven 2-Way method—lesson instruction PLUS actual practice with 10 big kits of radio parts. Helps you learn faster, more thoroughly. Many students earn money in spare time, while learning. Write for **FREE** book, "Your Opportunities in Radio, Television & Electronics," to **HOLLYWOOD RADIO & TELEVISION INSTITUTE**, (Established 1929) Dept. D-27, 810 West 6th St., Los Angeles 14, Calif. Approved for Veterans. Advise if eligible for G.I. training.

LEARN Commercial DEEP SEA DIVING



Train for a high paying and fascinating profession. 20 week course at world famous school. Expert instructors. Latest equipment. Specialized training in underwater construction, salvage, and general commercial diving. Approved for Veterans. Write for **FREE** Booklet.

SPARLING DIVING SCHOOL—Dept. PS-8
1148 Wilmington Blvd., Wilmington, Calif.

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

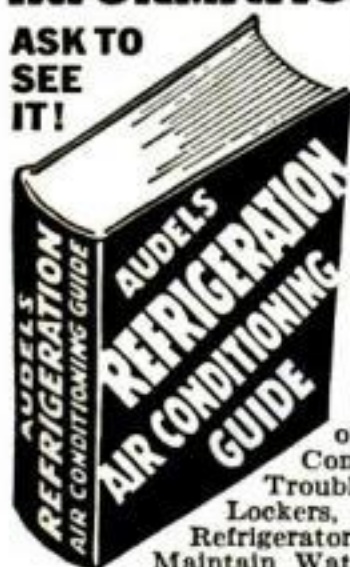
Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

142-E VICTOR BUILDING, WASHINGTON 1, D. C.

REFRIGERATION AIR CONDITIONING INFORMATION IN A HANDY FORM

ASK TO
SEE
IT!



Every Serviceman, Mechanic & Operator can use AUDELS REFRIGERATION & AIR CONDITIONING GUIDE, containing Practical, Inside Trade Information on the whole subject of Refrigeration & Air Conditioning. Tells How to Service, Operate & Repair Modern Household, Commercial & Industrial Units & Air Conditioning Systems. 1280 Pages, 46 Chapters Fully Illustrated & Indexed for Quick Reference.

1001 FACTS

This big, highly indorsed book, easy to understand, gives useful basic principles on How to Repair & Install Compressors, Control Devices. How to locate Electric Motor Troubles. How to Service & Adjust Cold Storage Lockers, Quick Freezing Units, Dairy & Market Refrigerators, Ice Cream & Soda Fountains, How to Maintain Water Coolers, Marine Refrigeration, Plant Auxiliaries, Ice Making, Ammonia Plants, Brine Systems, Servicing Air Conditioning Systems, Replacement of Refrigerants including Freons, Heat Transmission & Pressure Temperature Charts, Tables, Duct Systems, Safety Codes, etc.

\$4 ANSWERS YOUR QUESTIONS

Get this Information for Yourself. Mail Coupon today.
COMPLETE • PAY ONLY \$1. A MONTH

AUDEL, Publishers, 49 W. 23rd St., New York 10, N.Y.
MAIL AUDELS REFRIGERATION GUIDE for free examination. If O. K. I will send you \$1 in 7 days; then remit \$1 monthly until price of \$4 is paid. Otherwise I will return it.

Name _____

Address _____

Occupation _____

Employed by _____ P.S.M.

SALESMEN!

RED BLINKER

CASH IN WITH HANDILITE

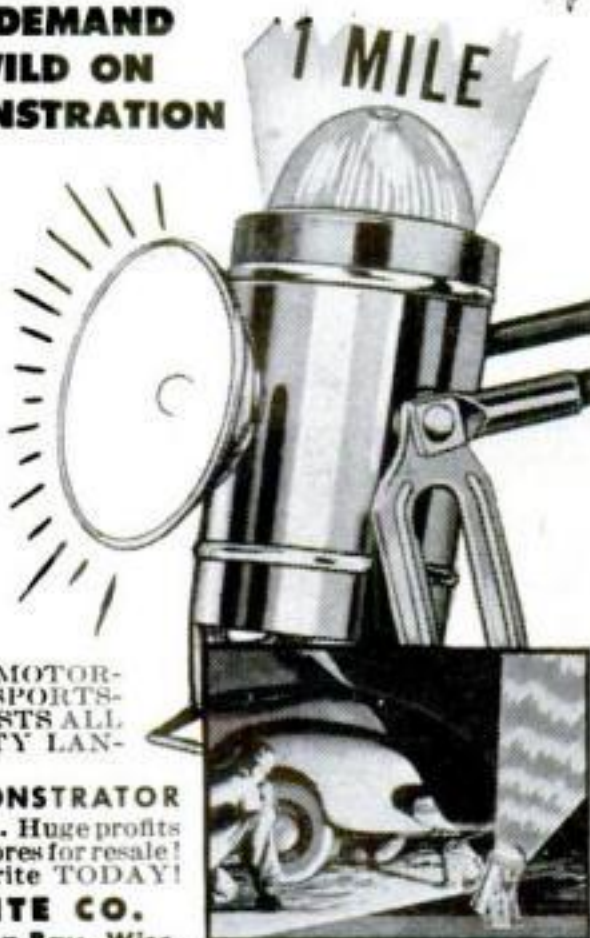
VISIBLE

CONSUMER DEMAND RUNNING WILD ON 1 SEC. DEMONSTRATION

Revolutionary new invention brings new protection to motorists and money making opportunity without parallel for live Agents — Salesmen — Distributors. **HANDILITE**—flashing ON-OFF Safety Lantern ends danger of night accidents when car is parked for emergency repairs. Casts powerful 1,000-foot beam plus flashing red warning signal! 3 WAY ACTION. Red flasher only — both flasher and white beam—or beam light only at turn of switch. **MOTORISTS — FLEETS — SPORTSMEN — VACATIONISTS ALL WANT THIS SAFETY LANTERN ON SIGHT.**

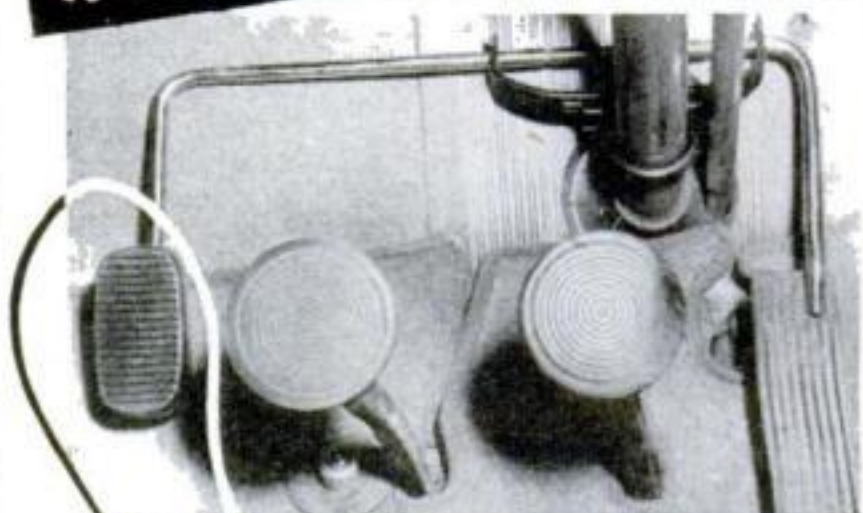
FREE! DEMONSTRATOR OFFER. Huge profits in direct sales and to stores for resale! Get Sample Offer. Write TODAY!

The HANDILITE CO.
Dept. 188 Sturgeon Bay, Wisc.



DRIVING RELIEF!

New LEFT-FOOT ACCELERATOR



Dealer
inquiries
invited.

Long drives are short with "Lefty"! Eliminate leg, back, and foot fatigue and enjoy greater driving comfort . . . feed gas with left foot when desired with "Lefty," the new left-foot accelerator. One trip will convince you. Cars, \$4.85; trucks, \$6.75; plus 3% California sales tax. Specify year and make.

C & B Co., 236 Sumner Street, Yuba City, California

NEW! DURABLE! 7 JEWELS!

3 YEAR SERVICE GUARANTEE

- SHOCK RESIST.
- DUST PROOF
- RADIUM DIAL
- SWEEP SECOND HAND
- CHROMED CASE
- LEATHER BAND

\$5.95

Post-paid

Plus 60c tax

Refund if not satisfied. Special! Order Now! Sorry, no C.O.D.'s.

LADIES Watch, as above, smaller Size \$6.95 plus 70c tax.

ELCO PRODUCTS CO., Dept. 10 166 W. Washington, Chicago 2, Ill.



LAWN ORNAMENT-NOVELTY PATTERNS

28 Lawn Ornament Patterns, 25c. Other patterns: 15-20" high; Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl, 10c each. 25 Novelty Patterns, 30c. All 62 Full Size Patterns, \$1.00 Postpaid.

FLYING DUCK

Wind revolves wings. Realistic appearance. Pattern, Instructions and wing Pinion Kit; brass bearing, steel shaft, wing lugs, bolts, nuts and washers, 50c. Pattern and Instructions without kit, 25c. Postpaid.

STROTHER PATTERN SERVICE
Dept. 7-80 Box 128 Belington, W. Va.



Learn Watch Repairing

Fascinating, dignified, and highly skilled trade that pays exceptionally well over more years of your life. Study in spare time in your own home or attend our resident school. School catalog sent free by return mail. Address Dept. B-21.

American Institute of Specialized Watch Repair
1012 Franklin, Southeast, Grand Rapids 7, Mich.

Want to Get Ahead in Business? Get A BUSINESS EDUCATION!

Regardless of whether your aim is to specialize or generalize in your business education, this nationally known and approved school will gladly counsel with you. We offer you nation wide recognition and placement service as secretary, stenographer, accountant or salesman. Hill's offer both Resident & Home Study Courses. Write **FREE**

Dept. PSS today for Big 32 page **SUCCESS BOOK**

**Hill's BUSINESS UNIVERSITY AND
EXTENSION SCHOOL**
619 W. MAIN ST. OKLAHOMA CITY 2, OKLAHOMA



Get
Into

TELEVISION, RADIO ELECTRONICS

Master ALL Phases

Get Complete Training. You Receive and Keep All Tubes, Equipment, Parts and Lessons. No Extra Charges.

**GOOD PAY
and Unlimited Opportunities
in JOBS LIKE THESE:**

Business of Your Own
Radio Manufacturing, Sales, Service
Broadcasting Telecasting
Television Manufacturing,
Sales, Service
Laboratories: Installation, Maintenance of Electronic Equipment, Electrolysis, Call Systems
Garages: Auto Radio Sales, Service
Sound Systems and Telephone Companies; Oil Well and Drilling Companies; Engineering Firms
Theatre Sound Systems Police Radio
And scores of other good jobs
in many related fields

**YOU CONDUCT MANY
EXPERIMENTS LIKE THESE!**

Checking action of condensers
Experiments with AF and RF Amplifiers
Experiments with resonance
Producing beat frequencies
Calibrating oscillators
Experiments with diode, grid-bias, grid-leak and infinite impedance detectors
Practical experience in receiver trouble shooting
Application of visual tester in checking parts and circuits
Experiments with audio oscillators
Advanced trouble-shooting
... and many, many others

**Complete Training by Practical
Resident Trade School, Est. 1905**

The same highly trained faculty, instruction materials and methods used here in our large, modern resident school, are adapted to your training in your own home. Shop Method Home Training has been proved by hundreds of successful graduates.

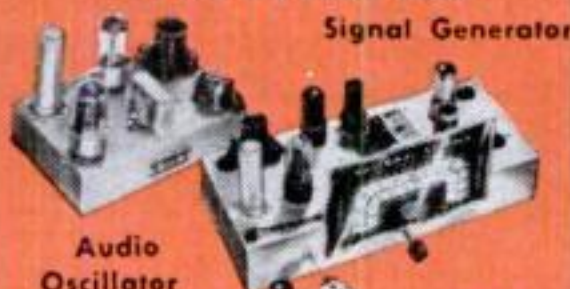
**Both Resident and Home Study
Courses Offered**

**YOU
LEARN BY
DOING**

You receive special laboratory experiment lessons to show you how to build with your own hands various experimental units such as those shown at left, and how to conduct many tests.



**YOU RECEIVE THIS
PROFESSIONAL MULTITESTER
YOU BUILD ALL THESE AND
MANY OTHER UNITS WITH
PARTS WE SEND YOU!**



Signal Generator



Audio
Oscillator



T.R.F.
Receiver



**You Receive a Special Series
of Modern Lessons in TELE-
VISION, all a part of your
course: you master all phases.**

You will find all lessons easy to understand because they are illustrated throughout with clear diagrams and step-by-step examples that you work out yourself. Every piece of the equipment and complete lesson material we send you is yours to keep and enjoy, including the multitester, experimental equipment, all parts of the Superheterodyne, tube manual, radio dictionary, and complete, modern Television texts. All parts are standard equipment.

**Shop Method Home Training ...
Earn While You Learn**

With our practical resident Shop Method Home Training, you study in your spare time. You receive Spare Time Work Lessons, which show you how to earn while you learn. Service neighbors' radios and TV receivers, appliances, etc., for extra money and experience. Many National students pay all or part of their training with spare time earnings!

**DON'T DELAY! The Radio-Television
Industry needs trained men NOW!**

**APPROVED
FOR
VETERANS!**

Check coupon below!

For quick action,
mail coupon
today and we'll
rush you full in-
formation.

Free!

**NEW, ILLUSTRATED
OPPORTUNITY
BOOK AND SAMPLE
LESSON SHOW YOU
HOW WE TRAIN
YOU ... SEND FOR
THEM TODAY! NO
COST. NO
OBLIGATION.**



NATIONAL SCHOOLS

LOS ANGELES 37, CALIF. • EST. 1905

FIND OUT NOW ... MAIL COUPON TODAY

National Schools, Dept. PS-8
4000 South Figueroa Street
Los Angeles 37, California

Send me your FREE book "Your Future in Radio" and the sample lesson of your course. I understand no salesman will call on me.

NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

☐ Check here if Veteran of World War II

Mail in envelope
or paste on
penny postal.

INVENTORS

If you consider your invention to be something of importance — if you have invented any new and useful art, machine, manufacture or composition of matter or improvement thereof — you are advised to protect your invention by applying for a U. S. patent.

This firm is registered to practice before the U. S. Patent Office and is available to assist in the preparation and prosecution of your patent application.

The "Evidence of Invention" form mentioned below is offered as a convenience to you in making your disclosure to us for search purposes.

You should date and sign your disclosure and have it witnessed by two or more persons who are capable of understanding your invention.

Your disclosure should be mailed to us together with a letter authorizing us to conduct a preliminary search among previously granted U. S. patents for similar types of invention.

We then make this search and prepare a report of the probable patentability of your invention. If such report is favorable, we recommend the further course for you to take.

The "Evidence of Invention" form and booklet are suggested as conveniences to you and us in starting action on your invention.

VICTOR J. EVANS & Co. *Merlin M. Evans*
REGISTERED PATENT ATTORNEY

540-J MERLIN BUILDING, WASHINGTON 6, D. C.

PATENTS

COPYRIGHTS

We shall be glad to send you promptly and without obligation, an instructive booklet, "Patent Protection for Inventors", which was prepared to give inventors detailed information and steps to take toward patent protection—also our convenient "Evidence of Invention" form. Use address Victor J. Evans & Co., 540-J Merlin Building, Washington 6, D. C.

~~EROSLEY~~ Announces ROLL-DOWN WINDOWS IN NEW SUPER LINE



See the new SUPER line of Crosley cars with deluxe features—Super Station Wagon, Super Sedan Deluxe, and Super Convertible have roll-down windows, new chrome trim, fold-up rear seat, with finer construction, custom details and tailoring, full interior finish. Equally important improvements on the Super Sports model, which includes the features of the famous Crosley Hotshot.



FREE! Latest 1950 CROSLLEY CATALOG. Write Crosley Motors, Inc., 2530-JU Spring Grove Ave., Cincinnati 14, Ohio

Also see improved Crosley trucks—Pick-up and Panel Delivery. Resident salesmen wanted! Write for details.

EROSLEY
a FINE car

"You see them everywhere"



NEW BATHROOM DEODORIZER

Secret chemical invention automatically banishes unpleasant odors in bathroom, kitchen, anywhere. Gives off refreshing fragrance. Just hang on wall. No liquids, sprays, or wicks. Needs no attention. Beautifully designed!

SAMPLES for AGENTS Sample offer sent immediately to all who send name at once. Hurry—postcard will do. SEND NO MONEY—just your name.

KRISTEE CO., 718 Bar St., Akron, Ohio



New EASY WAY TO MAKE BIG MONEY FULL OR SPARE TIME COSTS YOU 5c—YOU MAKE \$5.00

Make \$5 per hour right in your own home metalizing Baby Shoes in real Bronze, Silver, Gold, and Pearl. No experience needed. Start making money in one week—up to \$500-\$1,000 per month full time, up to \$75 per week spare time. Act at once—Send postcard for complete FREE details today!

KIKTAVI CO., DEPT. P5-8
2111 W. MANCHESTER • LOS ANGELES 44, CALIFORNIA

Learn CARPENTRY BRICK LAYING

Get into the billion dollar building trades. Learn now while opportunities are greatest. Train in our completely equipped shops under expert instructors. G.I. Approved. Enroll now. Limited Classes. Write for FREE catalog.

MIDWEST SCHOOL OF BUILDING TRADES, Dept. P5-8
411 N. Center St. Bloomington, Ill.

High School at Home

Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 52-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. HC-46
Drexel at 58th St., Chicago 37, Ill.

Without obligation, please send FREE descriptive booklet.

Name.....
Address.....

TELEVISION



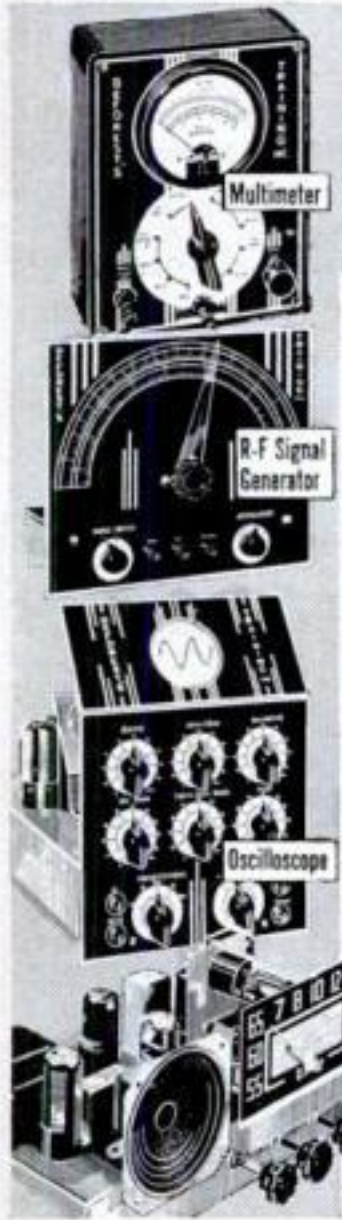
**RADIO and
ELECTRONICS
OFFER YOU**

**REAL MONEY and REAL
JOB OPPORTUNITIES!**

**OPTIONAL
FEATURE**

**BUILD AND KEEP FULL-VIEW 16-INCH
RECTANGULAR "BLACK" PICTURE TUBE
TELEVISION RECEIVER**

**PREPARE AT HOME . . . Become a
TELEVISION • RADIO • ELECTRONICS
TECHNICIAN! *No Previous Experience Necessary***



Here is everything you need to prepare you at home for FASCINATING WORK, GOOD MONEY and a THRILLING FUTURE in one of America's most promising fields. This includes the opportunity to build and keep the top-quality 16 inch rectangular picture tube television receiver shown above or a 10 or 12½ inch ROUND picture tube set . . . if you choose. No matter which tube you select, you will get bright, sharp, steady pictures. This is an optional feature—available at slight additional cost when you complete your training described below. Get the complete facts. See how D.T.I.'s wonderfully practical method meets industry's needs. No previous experience needed. Mail coupon today!

16 Big Shipments of Parts — Plus Lessons

Work over 300 electronic experiments and projects from 16 big shipments of parts. This includes building and keeping all test equipment and radio set shown at left side of page. Modern easy-to-read lessons with handy fold-out diagrams simplifies your entire training.

You Also Use Home Movies

D.T.I., alone, includes the modern, visual training aid MOVIES to help you learn faster, easier at home. See electrons on the march and other fascinating "hidden action" — a remarkable home training advantage that speeds your progress.

EMPLOYMENT SERVICE

When you complete your training, our effective Employment Service helps you get started toward a real future in Television-Radio-Electronics.

Modern Laboratories

If you prefer, you can get ALL your preparation in our new, Chicago training laboratories . . . one of the finest of its kind. Ample instructors . . . modern equipment. Write for details!

6 Tube
Radio
Receiver.

**LEARN-BY-
READING**



**LEARN-BY-
SEEING**

**LEARN-BY-
DOING**



MAIL THIS COUPON TODAY !

DeFOREST'S TRAINING, INC. Dept. PS-G-8
2533 N. Ashland Ave.,
Chicago 14, Illinois

Without obligation, give me complete facts showing how I may make my start in Television-Radio-Electronics.

Name..... Age.....
Street..... Apt.....
City..... Zone..... State.....

DeForest's Training, Inc.
CHICAGO 14, ILLINOIS
A DeVry Institution

RAILWAY
POSTAL CLERK

GOVERNMENT
CLERK

MAIL
CARRIER

POSTOFFICE
CLERK

START AS HIGH AS \$3,450 YEAR

Many Early Examinations Expected. Prepare NOW! Veterans Get Special Preference! 40 Page Civil Service Book FREE Mail Coupon Today SURE

COUPON

Franklin Institute
Dept. G-80
Rochester 4, N. Y.

(Not Government Controlled)

Gentlemen: Rush to me, FREE of charge, list of U. S. government big pay jobs. Send FREE 40-page book describing salaries, vacations, hours, work, etc. Tell me how to qualify for one of these jobs.

Name.....

Street.....

City..... Vet?.....

HERE'S A NEW AND VITAL BUSINESS!

LEARN ELECTRICAL EQUIPMENT SERVICING

OFFERS BIG MONEY—INDEPENDENCE

Learn in spare time at home. NEW Shop Method Training System. Work as many hours as you wish—the Electrical Equipment Technician is his own boss. It is not unusual for a technician to charge on the basis of \$5.00 to \$6.00 an hour! Command big wages!

NO PREVIOUS EXPERIENCE NEEDED

We furnish everything! Tool kits, training kits, including the famous Christy trouble-detecting ELECTRONIC KIT. Plus illustrated instructions written in simple, easy-to-understand language, check full of photographs and drawings. Shows you how to repair factory and household electrical units. Power machinery, refrigerators, washing machines, vacuum cleaners, irons, etc. Gives you a working knowledge of electricity, house wiring, motor winding, welding, nickel plating, etc. Shows how to build power tools you need, how to solicit business and what to charge. Many report paying for their entire course, tools, etc. on earnings made at home while learning!

FREE BOOK SENT TO YOU

Send your name for FREE booklet on Electrical Equipment Servicing and instructions for paying us later from your EARNINGS WHILE LEARNING!

CHRISTY TRADES SCHOOL

DEPT. D-9301 4432 N. KEDZIE AVE., CHICAGO 25, ILL.

STEEL AIR TANKS

Steel pressure tanks suitable for compressors, pneumatic units, gases, hydraulics, and liquids. Rated at 500 lbs. per square inch pressure.

	Size	Wt. Lbs.	Internal Volume	Price
A	7 1/2" x 5 1/4"	1 1/2	104 cu. in.	\$1.25
B	14 1/2" x 5 1/2"	3 1/2	280 cu. in.	2.00
C	24" x 6"	5	500 cu. in.	2.50
D	45" x 6"	11	1000 cu. in.	4.50
E	24" x 12"	18	2100 cu. in.	5.50

Prices F.O.B. Chicago. Include approx. postage on orders paid for in advance. C.O.D. orders enclose 25%, balance sent C.O.D. WRITE FOR FREE ILLUSTRATED CIRCULAR.

U. A. S. Corp. Dept. PS-8 5637 W. 63rd Pl.
Chicago, Illinois

WATCHMAKING

Be a Watchmaker—Be Independent

Get practical training in Chicago's first accredited watchmaking school. Day and Evening Classes—Approved for Veterans.

Write today for free information

CHICAGO INSTITUTE OF WATCHMAKING
6 East Lake Street Dept. PS-8 Chicago, Illinois

Be an AUTO MACHINIST

Draw Top Pay—No Job Worries

Be a high-paid auto machinist! Specialize—make more money. New FREE booklet tells how to prepare for good jobs as an auto machinist or auto mechanic. G. I. Approved School of Auto Mechanics.

FREE: Write for your FREE booklet today

AMERICAN TRADE SCHOOLS
2407D McGee Street, Kansas City, Mo.



WHEELS—WHEELS

5" Disc Wheel 3/8" Tire 5/16" or 3/8" sleeve	30c ea.
6" Disc Wheel 3/8" Tire 5/16" or 3/8" sleeve	35c ea.
7" Disc Wheel 3/4" Tire 3/8" sleeve	45c ea.
8" Disc Wheel 1 1/8" Tire 1/2" sleeve	70c ea.
7" Disc Wheel 1" Tire 1/2" ball bearing	80c ea.
8" Disc Wheel 1 1/8" Tire 1/2" ball bearing	\$1.00 ea.
8" Disc Wheel 2" semi-pneum. T. 1 1/2" B.B.	\$1.35 ea.
10" Disc Wheel 1.75 semi-pneum. T. 1 1/2" B.B.	\$1.50 ea.
12" Disc Wheel 1.75 semi-pneum. T. 1 1/2" B.B.	\$1.85 ea.

Above wheel prices include hub cap.
Plus Postage, 20¢ — C.O.D.'s accepted.

UNITED WHEEL STAMPING CO., PS-8
2756 W. 115th STREET CHICAGO 43, ILLINOIS

4 SPEED MOTOR



Has 1001 uses for everyone!

A precision built motor. Has four 1/4" drive shafts turning simultaneously at following speeds: 4000 RPM for grinders, buffers, flexible shaft tools, etc. 150 RPM for slow speed tools, driving pumps, etc. 25 RPM—rocker for photo developing tray and other photo applications, erector sets, lab use, etc. 5 RPM for turning antennas, adv. displays, barbecue pits. Excellent all-around motor for driving gadgets, tools, laboratory use for technicians. SIMPLE to OP-

professional men and ERATE. ONLY.....ea. \$8.88 post paid

SPECIAL . . . 6 volt motor, aircraft & auto type, many uses . . . ONLY.....ea. \$1.88 post paid

3 for.....\$4.88 postpaid

PORTABLE FIELD TELEPHONE, complete with ringer circuit and handset, 5"x6"x9". Simple to wire. Operates 15 miles and upwards. Includes batteries, ready to run.

USES: television installation, intercom system, construction work, any inside and outside communication. Complete in rugged steel case for years of trouble-free service. Low.....ea. \$14.88 post paid

est Price Ever Offered.....ea. \$14.88 post paid

2 for only \$26.88 postpaid

SATISFACTION GUARANTEED!

Send check, cash or money order. Sorry no C.O.D.'s.

CONTINENTAL ENGINEERING COMPANY, Dept. PS-8 2635 W. Grand Ave., Chicago 12, Illinois



FILL THE GAPS IN YOUR TRAINING

No one goes into a job perfectly prepared. Sooner or later the "weak spots" are bound to show up. And when they do, the successful man is quick to recognize them, *quick to fill the gaps*. International Correspondence Schools can help you get whatever training *you* may need. You have some 400 famous, spare-time I.C.S. Courses to choose from. Or, if you wish, brief "refresher" courses, advanced lessons, or special instruction combining one or more specific business or technical subjects can be *tailored* to fit your needs. The coupon below brings full information without obligation. Mark and mail it today!



INTERNATIONAL CORRESPONDENCE SCHOOLS

APPROVED
under the
G.I. BILL

BOX 7660-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

- | | | | |
|--|---|---|--|
| Business and Academic Courses
<input type="checkbox"/> Accounting <input type="checkbox"/> Advertising
<input type="checkbox"/> App. Psychology <input type="checkbox"/> Bookkeeping
<input type="checkbox"/> Business Administration
<input type="checkbox"/> Bus. Correspondence <input type="checkbox"/> Bus. Law
<input type="checkbox"/> Certified Public Accounting
<input type="checkbox"/> Commercial
<input type="checkbox"/> Commercial Art
<input type="checkbox"/> Cost Accounting
<input type="checkbox"/> Federal Tax
<input type="checkbox"/> First Year College
<input type="checkbox"/> Foremanship <input type="checkbox"/> French
<input type="checkbox"/> Good English <input type="checkbox"/> High School
<input type="checkbox"/> Higher Mathematics <input type="checkbox"/> Illustration
<input type="checkbox"/> Industrial Supervision
<input type="checkbox"/> Motor Traffic <input type="checkbox"/> Postal Civil Service
<input type="checkbox"/> Retailing <input type="checkbox"/> Retail Bus. Management
<input type="checkbox"/> Salesmanship <input type="checkbox"/> Secretarial
<input type="checkbox"/> Sign Lettering <input type="checkbox"/> Stenography
<input type="checkbox"/> Spanish <input type="checkbox"/> Traffic Management
Air Conditioning and Plumbing Courses
<input type="checkbox"/> Air Conditioning
<input type="checkbox"/> Heating <input type="checkbox"/> Plumbing
<input type="checkbox"/> Refrigeration <input type="checkbox"/> Steam Fitting | Chemical Courses
<input type="checkbox"/> Chemical Engineering
<input type="checkbox"/> Chemistry, Analytical
<input type="checkbox"/> Chemistry, Industrial
<input type="checkbox"/> Chemistry, Mfg. Iron & Steel
<input type="checkbox"/> Petroleum Refining <input type="checkbox"/> Plastics
<input type="checkbox"/> Pulp and Paper Making
Civil Engineering, Architectural and Mining Courses
<input type="checkbox"/> Architecture <input type="checkbox"/> Architectural Drafting
<input type="checkbox"/> Building Estimating
<input type="checkbox"/> Civil Engineering <input type="checkbox"/> Coal Mining
<input type="checkbox"/> Contracting and Building
<input type="checkbox"/> Highway Engineering
<input type="checkbox"/> Lumber Dealer
<input type="checkbox"/> Reading Structural Blueprints
<input type="checkbox"/> Sanitary Engineering
<input type="checkbox"/> Structural Drafting
<input type="checkbox"/> Structural Engineering
<input type="checkbox"/> Surveying and Mapping
Communications Courses
<input type="checkbox"/> Electronics
<input type="checkbox"/> Prac. FM and Television
<input type="checkbox"/> Prac. Telephony <input type="checkbox"/> Radio Operating
<input type="checkbox"/> Radio, General <input type="checkbox"/> Radio Servicing
<input type="checkbox"/> Telegraph Engineering | Electrical Courses
<input type="checkbox"/> Electrical Drafting
<input type="checkbox"/> Electrical Engineering
<input type="checkbox"/> Electric Light and Power
<input type="checkbox"/> Lighting Technician
<input type="checkbox"/> Practical Electrician
<input type="checkbox"/> Power House Electric
<input type="checkbox"/> Ship Electrician
Internal Combustion Engines Courses
<input type="checkbox"/> Auto Technician <input type="checkbox"/> Aviation
<input type="checkbox"/> Diesel-Electric
<input type="checkbox"/> Diesel Engines <input type="checkbox"/> Gas Engines
Mechanical Courses
<input type="checkbox"/> Aeronautical Engineer's, Jr.
<input type="checkbox"/> Aircraft Drafting <input type="checkbox"/> Flight Engineer
<input type="checkbox"/> Forging <input type="checkbox"/> Foundry Work
<input type="checkbox"/> Heat Treatment of Metals
<input type="checkbox"/> Industrial Engineering
<input type="checkbox"/> Industrial Instrumentation
<input type="checkbox"/> Industrial Metallurgy
<input type="checkbox"/> Machine Shop
<input type="checkbox"/> Machine Shop Inspection
<input type="checkbox"/> Mechanical Drafting
<input type="checkbox"/> Mechanical Engineering | <input type="checkbox"/> Mold-Loft Work
<input type="checkbox"/> Patternmaking—Wood, Metal
<input type="checkbox"/> Reading Shop Blueprints
<input type="checkbox"/> Sheet-Metal Drafting
<input type="checkbox"/> Sheet-Metal Worker <input type="checkbox"/> Ship Drafting
<input type="checkbox"/> Ship Fitting <input type="checkbox"/> Tool Designing
<input type="checkbox"/> Toolmaking <input type="checkbox"/> Welding Engineering
<input type="checkbox"/> Welding—Gas and Electric
Railroad Courses
<input type="checkbox"/> Air Brake <input type="checkbox"/> Car Inspector
<input type="checkbox"/> Diesel Locomotive
<input type="checkbox"/> Locomotive Engineer
<input type="checkbox"/> Locomotive Fireman
<input type="checkbox"/> Locomotive Machinist
<input type="checkbox"/> Railroad Section Foreman
<input type="checkbox"/> Steam and Diesel Loco. Eng.
Stationary Engineering Courses
<input type="checkbox"/> Boilermaking
<input type="checkbox"/> Combust. Engrg. <input type="checkbox"/> Engine Running
<input type="checkbox"/> Marine Engineering
<input type="checkbox"/> Power Plant Engr. <input type="checkbox"/> Steam Engineer
Textile Courses
<input type="checkbox"/> Cotton Manufacturing <input type="checkbox"/> Loom Fixing
<input type="checkbox"/> Rayon Weaving <input type="checkbox"/> Textile Designing
<input type="checkbox"/> Woolen Manufacturing |
|--|---|---|--|

Name _____ Age _____ Home Address _____

City _____ State _____ Working Hours _____ A.M. to _____ P.M.

Present Position _____ Employed by _____

Length of Service _____ Enrollment under G.I. Bill approved for World War II Veterans. Special tuition rates to members of the Armed Forces.
In World War II _____ Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.



HIGH PAY • SECURITY When You LEARN A TRADE

Get ready for a well-paid, lifetime job or a business of your own in one of these **FIVE ESSENTIAL TRADES**. Complete training under expert instructors with practical experience prepares you to step into a good paying job with a future and security.

ELECTRICITY: Basic electricity, Residential and Industrial Wiring and Appliance Repair.

PLUMBING: Every phase — pipe cutting and threading to complete installations, blue print reading.

AUTOMOTIVE & TRACTOR: Engine overhaul, Transmissions, Carburetion, Generator-Ignition Systems, Tune Up.

DRAFTING: College level training in general Machine and Architectural Drafting.

SHOE REPAIRING: Complete practical training includes reconditioning and rebuilding.

Approved For Veteran's Training

NATIONAL TRADE SCHOOL

DEPT. C • 2610 Grand • Kansas City 8, Mo.

Without obligation to me please send full information on the course checked.

.....Automotive and Tractor TechnicianDrafting

.....PlumbingElectricityShoe Repairing

Name.....Age.....

Address.....

City.....State.....

Veteran?.....



LABORATORY TECHNICIAN

BE A LABORATORY SPECIALIST; complete course. Big demand from hospitals, doctors, clinics. We teach all branches of medical laboratory work, including Medical and Dental X-Ray.

Approved by American College of Medical Technologists

Co-educational Free Placement Bureau
Free Catalog—Accredited for "veteran" training

CHICAGO COLLEGE OF LABORATORY TECHNIQUE
Dept. P.S. 431 S. Wabash Ave. Chicago 5, Illinois

INVENTORS

Before you make any effort to market your invention, you should take the first steps toward proceeding for patent protection.

The usual first step is to have a search of the U. S. patent records conducted, so that I can report to you on the question of patentability.

I shall be pleased to furnish you with information relative to patent procedure upon request from you, and this will be without any obligation on your part.

PATRICK D. BEAVERS

(Formerly RANDOLPH & BEAVERS)

Registered Patent Attorney

937 Columbian Building, Washington 1, D. C.

FREE! 5 Days Trial Automatic Transmissions Simplified

Learn all about: Hydra-Matic, Dynaflo, Ultramatic, Powerglide, Gyro-Matic, Tip-Toe Shift, Simplimatic, Drive-Master and all other transmissions.

Automatic Transmissions Simplified is not a rehash of old material but a completely new, planned encyclopedia which describes, illustrates (over 175 illustrations including 8 pages in color) and explains every detail of every transmission, in simple, understandable language.

It will serve as a guide in handling all kinds of transmission jobs; will put you right into this highly profitable end of auto servicing.

SEND NO MONEY

Simply clip this ad and mail with name and address. When book arrives look it over, use it for 5 days. If not pleased return and pay nothing. If you keep book send only \$4.00 plus few cents postage.

Note: We pay postage if remittance accompanies order. Same return privilege.



THE GOODHEART-WILLCOX CO. Dept. 134, 1321 S. Michigan Ave., Chicago 5, Ill.

HELP FOR INVENTORS

Hundreds of manufacturers have requested our assistance in locating marketable new products.

Complete information, free.

INSTITUTE of AMERICAN INVENTORS

Dept. 3, 631-E St., N.W., Washington 4, D. C.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH

Registered Patent Attorney

205 Columbian Building Washington 1, D. C.

PATENTS PATENT LAWYER

Gustave Miller

REGISTERED PATENT ATTORNEY

80-PS WARNER BLDG.
WASHINGTON 4, D. C.

ASSOCIATE EXAMINER

U. S. PATENT OFFICE 1922-1929

PATENT ATTORNEY & ADVISOR

U. S. NAVY DEPT. 1930-1947

Send for **PATENT INFORMATION**
Book and "INVENTOR'S RECORD"
without obligation.



PATENTS

C. A. SNOW & CO.

REGISTERED PATENT ATTORNEYS

WRITE FOR INFORMATION TO

426 SNOW BUILDING, WASHINGTON 1, D. C.



INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION, You should take steps to protect it by a U. S. Patent. Write me for "RECORD OF INVENTION" form.

CARL MILLER

REGISTERED PATENT ATTORNEY

WOOLWORTH BLDG., 35th FLOOR, 80C,
NEW YORK CITY

Repair Electrical Appliances and Utilities with the aid of
THE NEW MODEL 50

UTILITY TESTER



Compact—Measures 3 1/8" x 5 7/8" x 2 1/4"

A NEW KIND OF INSTRUMENT FOR TESTING ALL
ELECTRICAL CIRCUITS AND APPLIANCES SUCH AS —

- RANGES
 - SHAVERS
 - HEATERS
 - IRONERS
 - WASHERS
 - FANS
 - VACUUM CLEANERS
 - AIR CONDITIONERS
 - REFRIGERATORS
 - SUN LAMPS
 - TOASTERS
 - WASHING MACHINES
- and MOTORS

[ALL MOTORS—single phase, multi-phase, universal, squirrel cage, induction, in fact every type of motor from fractional H.P. to 2 H.P.]

THE MODEL 50 UTILITY TESTER:

- Will test condensers for both opens and shorts.
- Will accurately check and locate the exact cause of failure in 3 way heat control switches.
- Will check field coils for opens and shorts.
- Will indicate when one side of an appliance or motor connected to the line under test is "grounded".

- Will measure the *actual current consumption* of any appliance or utility either A.C. or D.C. and will measure it *while the unit is in operation*. The reading will be direct in amperes. The appliance or utility may be plugged directly into the front panel receptacle. A special pair of insulated clip-end leads is included for motors, etc.
- Will measure the actual voltage and indicate whether the current is A.C. or D.C. and if the frequency is 25 cycles or 60 cycles.
- Incorporates a sensitive direct-reading resistance range which will accurately measure all resistances commonly used in electrical appliances, motors, etc. This range will enable continuity checks and tests for shorts and opens.
- Will indicate excessive leakage between a motor and a line up to 10 Megohms.
- Will indicate when a three phase motor is running erratically due to a "blown" fuse.
- Will test Thermostats under *actual working conditions*.
- Is the ideal trouble-shooter as it will instantly locate opens, shorts and grounds.
- Will test all bulbs, radio tube filaments, pilot light lamps, all fuses including cartridge, screw, etc., fluorescent bulbs, etc.

SHIPPED ON APPROVAL NO MONEY WITH ORDER—NO C.O.D.

TRY BEFORE YOU BUY! Yes, you need send no money with order or pay anything on delivery. Simply fill out this order form and mail it today. Try the Model 50 for 10 days. If completely satisfied, remit \$13.90. If not, return the instrument—no explanation necessary.

The Model 50 Utility Tester comes housed in a round cornered molded bakelite case. Complete with all test leads and operating instructions—only...

\$13⁹⁰

GENERAL ELECTRONIC DISTRIBUTING CO.

PS-8

98 PARK PLACE, NEW YORK 7, N. Y.

Please rush one Model 50 Utility Tester. I will either remit \$13.90 after a 10-day trial or return the instrument via Parcel Post.

Name.....

Address.....

City..... State.....

FREE PREMIUM!!

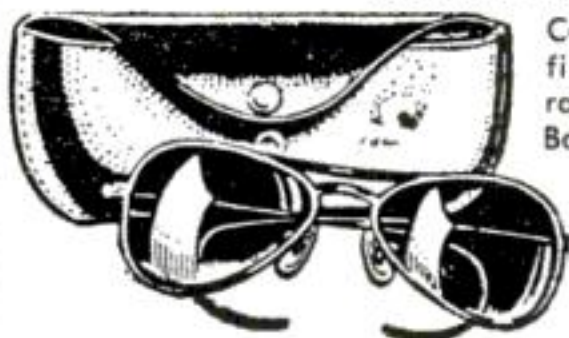
☐ Check here if you include \$13.90 payment with order. In return for saving due to bookkeeping, we will include a set of 6 assorted key chains with your Model 50. If the Model 50 does not meet with your wholehearted approval after a 10-day trial, return it for full immediate refund of \$13.90—keep the premium for your trouble.

AUGUST 1950 25

DELIVERED TO YOUR DOOR POSTAGE PREPAID!

Everything Sold with Unconditional Money Back Guarantee

NEW! OPTICALLY GROUND and POLISHED "Air Force" SUNGLASSES



Cool green lenses filters out harmful rays. Pearloid Sweat Bar—Gold Lacquered Frames, Streamlined Hinges, Flexible Temples.

\$1.95 VALUE

85c

We Pay Postage

Attractive, comfortable. Grand for Sports, Motor-ing, etc.

WITH ALL LEATHER CASE

NEW — ALL PURPOSE SPORT BAGS



With Full Zipper Opens All Around Perfect as a • Bowling Bag Holds a ball and shoes Easily! • For Golfers, Fishermen, Hunters, etc. Attractive, Strong Easily Worth \$2.50



Made of Fine Woven Khaki Canvas, Double Lined

\$1.10

We Pay Postage

New—Real U. S. Army Surplus ARTIC—ALL FEATHER SLEEPING BAGS

• Water repellent Poplin Cover • Full Front Zipper • Thickly filled with feathers • Finest Quality throughout.



We Pay \$29.95 all Postage Value

\$41.75

SEND FOR FREE CATALOG — AMAZING VALUES!

UNIVERSAL ENTERPRISES

DEPT. 8 946 S. MAIN ST. LOS ANGELES 15, CALIF. WE PAY POSTAGE, TAXES, INSURANCE ON ALL ARTICLES.

\$4.95

REAL ENGINE VALUE



A miniature gas engine that really operates. Thousands of Buzz "B" gasoline engines have been sold at twice the price. Now is your chance to buy a real 1/6th H.P. gas engine for only \$4.95. Turns up over 8,000 rpm. For Boats, planes, midget cars, etc. Guaranteed and ready to run. Includes Champion spark plug and tank. Send only \$1.00. engine shipped collect for balance, same day. Write for free catalog or SEND 10c FOR NEW MAMMOTH ILLUSTRATED CATALOG OF THOUSANDS OF HOBBY ITEMS.

America's Hobby Center, Inc., Dept. S-80, 156 West 22 St., N.Y. 11

Up to \$18.00 in an Evening's Spare Time!



29,000,000 prospects waiting for amazing refrigerator control! EXCLUSIVE D-Frost-O-Matic ends messy, wet defrosting... Saves Food... Saves Electricity. Safe, Automatic—GUARANTEED TWO FULL YEARS!

SURE-FIRE SALES PLAN—Clicks 95 times in 100 in Homes, Apartments. Harry Smith of Florida made \$1,500 in 1st two weeks. How much do you want? Write for FREE DETAILS—TODAY! Specify Territory.

6 N. Michigan Ave., Dept. PS-8, Chicago 2, ILL.

D-FROST-O-MATIC

26 POPULAR SCIENCE

ROCKET PERFORMANCE

"Vapojet" is designed on the accepted water injection principle so successfully used on wartime aircraft to increase speed, power and efficiency. "Vapojet" captures water vapors from the radiator and oil vapors from the crankcase, combines them with the fuel, and converts this normally lost power into productive energy and superior performance. Users claim faster pickup, smoother running and extra mileage. "Vapojet" fits most cars and tractors... especially effective with high compression engines. Easy installation takes minutes. 30 DAY MONEY BACK GUARANTEE!



U.S. Patent 2,188,175

AGENTS WANTED

Distributors

B & G AIR SERVICE, INC.

Dept. PSA, 13610 S. Central, Los Angeles 2, Calif.

"Vapojet" is designed to reduce carbon "ping"... engine wear... AND GIVES automatic adjustment of fuel-air ratio at any altitude. ORDER TO-DAY only

\$9.95

postpaid. Check or money order. \$1 deposit on C.O.D. List car, year, no. cylinders.

HAT CLEANING AND BLOCKING

Train for one of these Big Fields in the Largest and Best Equipped School of its kind. Learn by doing in modern training shops. Fine opportunities for good job or business of your own.

CHICAGO SCHOOL OF SHOE REBUILDING, Dept. PS-8 124 E. 26th Street

Shoe Repairing

Complete Hat Cleaning and Blocking Training in only 12 weeks. Approved for Veterans under G.I. Bill. Low weekly or monthly payment plan for non-vets. Write for free booklet.

Chicago 16, Illinois



LEARN HOW TO HYPNOTIZE

COMPLETE—ONLY \$1.95, POSTPAID! Amazing self-study lessons... in simple, easy to understand language. How to select a subject—how to hypnotize by telephone—how to make money from hypnotism—mental telepathy—stage hypnotism—self-hypnosis; how modern hypnotism is used to conquer inferiority complex, fear, battle fatigue, timidity, etc. Clear, helpful pictures show operating positions, movements. Money-back guarantee. Only \$1.95, postpaid—or COD, plus postage. Write today!

Nelson-Hall Co., 1139 S. Wabash Ave., Dept. 2H-1, Chicago 5, Ill.

New Thrills for Model Railroaders!



Hundreds of new ideas that will save you money and make model railroading more fun than ever! Shows how to lay your own track, how to make automatic signal systems, culverts, roundhouses, tunnels, switches and other modern railroad equipment.

It's easy to follow the clear, simple instructions and diagrams in this new book. Shows how to make freight cars, baggage cars, pullmans and day coaches. In addition, there are complete instructions and blueprints for building a Pennsylvania R. R. type locomotive.

SEND NO MONEY

Just write for your copy of MODEL RAILWAYS today, and pay the postman only \$2.49 plus a few cents postage on delivery. If you prefer to remit now we pay postage. Money back if not satisfied. Address

POPULAR SCIENCE MONTHLY—Dept. 850

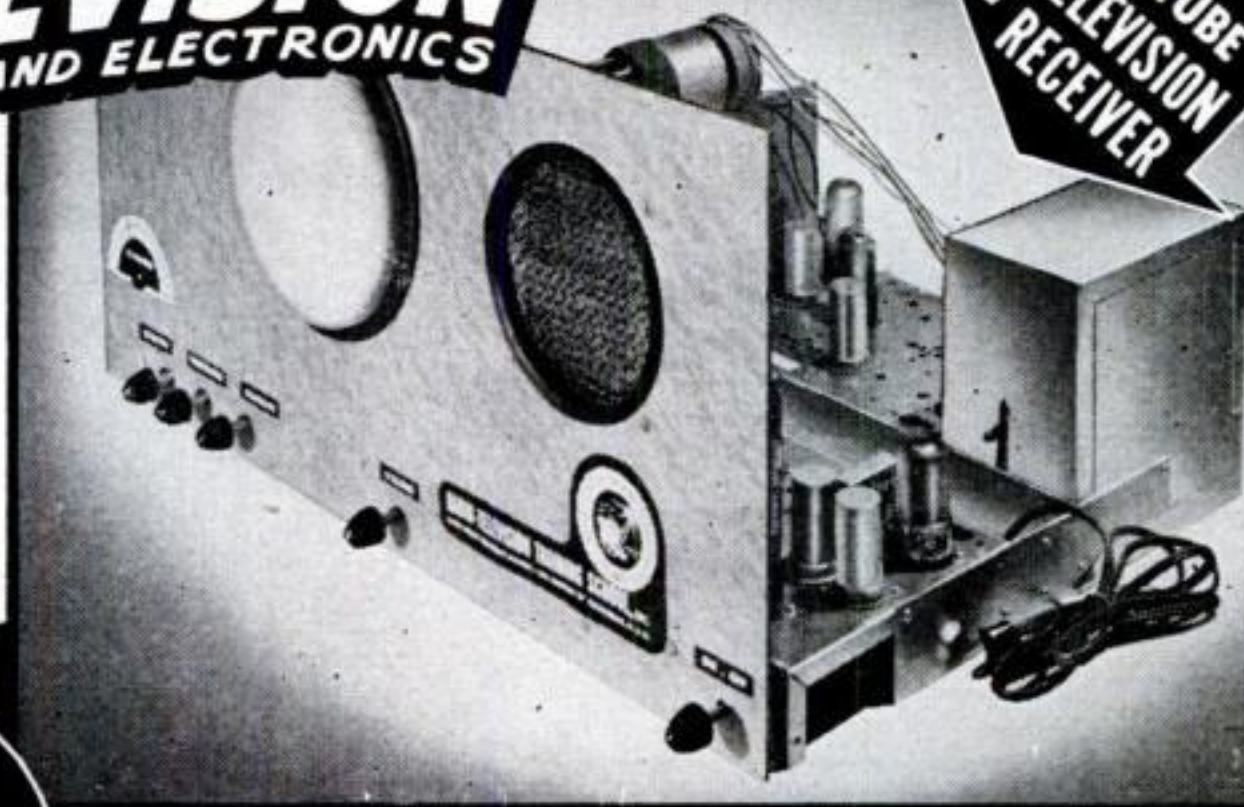
353 Fourth Avenue

New York 10, N. Y.

R.T.S. - ORIGINATORS OF PRACTICAL HOME TRAINING

IN **TELEVISION** RADIO AND ELECTRONICS

**YOU BUILD
THIS
23-TUBE
TELEVISION
RECEIVER**



**YOU
KEEP ALL
EQUIPMENT
—it's Yours!**

...GIVES YOU 11 BIG TELEVISION & RADIO KITS AT NO EXTRA COST!

Let RTS show you how to **MAKE GOOD MONEY** in Radio and Television. Learn NOW while Television is in its infancy. Be ready for the **BIG BOOM** in America's fastest growing Industry. You will work and learn with **REAL TELEVISION** and **RADIO EQUIPMENT—RIGHT AT HOME!** Study in spare time. You can **EARN EXTRA MONEY** while learning, like many RTS students.

Located in the heart of the Radio-Television capital of America—RTS has trained thousands during the past 28 years. RTS was **FIRST** to make practical **TELEVISION** training possible at home.

Opportunities are wide open! More than 3 and a half million TV receivers now in use! More than 60 million radios in the country! Daily the demand for **TRAINED MEN INCREASES... EVERYWHERE!** Prepare NOW for these better jobs at **GOOD PAY!** **INVESTIGATE!** If you want a career in Radio-Television **DON'T ACT WITHOUT GETTING THE FACTS FROM THE LEADER—RTS—ORIGINATORS OF PRACTICAL TELEVISION HOME TRAINING!** Send coupon for Actual Lesson and **BIG ILLUSTRATED BOOK** — both sent to you **FREE!**

FOLLOW THE LEADER • GET THE FACTS

**RADIO-TELEVISION TRAINING SCHOOL, DEPT. PS-8
5100 South Vermont Avenue, Los Angeles 37, Calif., U.S.A.**

Send **FREE** Illustrated Book showing how I can make good in **TELEVISION** and Radio through training under the guidance of expert RTS Technicians. No obligation. (No Salesmen will call)

NAME _____ AGE _____

ST. & NO. _____

CITY _____ ZONE _____ STATE _____

RADIO-TELEVISION TRAINING SCHOOL

5100 S. Vermont Ave., Los Angeles 37, Calif., U.S.A.

ESTABLISHED 1922 — 28 YEARS AGO

**Both
Free!** SEND FOR
LESSON
AND BIG
ILLUSTRATED BOOK



SUCCESS AND SECURITY

THROUGH TECHNICAL TRAINING

Increase your earning power. Send today for our free 150 page handbook "ENGINEERING OPPORTUNITIES" giving details of over 90 homestudy courses in all branches of Civil, Mining, Structural, Mechanical, Plastics, Electrical, Radio, Aeronautical Engineering and other fields.

Without obligation, write Canadian Institute of Science & Technology Ltd., 506 Century Building, 412-5th Street, N.W., Washington 1, D.C. Canadian inquiries — 263 Adelaide St. W., Toronto, Ont. Special discount for Servicemen.



MAIL THIS COUPON TODAY!

Name.....

Address.....

Age.....

How to IMPORT! For Profit and Pleasure

ONCE-IN-A-LIFETIME OPPORTUNITY

World Trade boom offers new, big money opportunities for men and women! Learn how to import at low foreign prices for buyers in your locality at high U. S. prices.

BUY-SELL, WORLD-WIDE WITHOUT CAPITAL

Big profits possible, no investment in goods, operating world-wide business from your own home by mail order, spare or full time. (See examples of recent prices in other countries, at left). Also big savings on clothes, tools, gems, antiques, watches, cameras, china, silk, toys, etc., for your own use. Get FREE list of over 1000 low priced imported products from Europe, the Orient and other parts of the world. It makes no difference where you live. World Trade can be carried on in or near small towns or large cities—anywhere. Travel opportunities. Practical, low-cost World Trade Course teaches you quickly at home in spare time.

WORLD TRADE GROUP HELPS YOU START

Membership in International Traders Guild included with course. Helps you get samples and prices and go after big profits NOW Importing and Exporting. No previous special experience or schooling required. World Trade Certificate awarded. There is no obligation when you send for FREE details and list of Imports. (No salesman will call on you.) Write today. Airmail reaches us overnight.



The Mellinger Co., Exporters-Importers
1418 DK Westwood Blvd., Los Angeles 24, Calif.



NEW! SENSATIONAL DEVICE ENABLES ANYONE TO TEST OWN EYES



RIGHT AT HOME

SAVE up to \$15.00 On Glasses

Big News to the Millions of Spectacle Wearers and Prospects. Means Freedom from Outrageous Prices. Perfect Satisfaction Guaranteed! No Risk!

MAKE BIG MONEY QUICK
FREE SAMPLE KIT!

Send for Free Sample at once. Show it to friends and others. Let them use it Free and watch their amazement over this new system of Self Testing. Here is a great new opportunity in a tremendous new field of unlimited possibilities. Spare or full time. No experience or capital needed. Act quick!

Clark Optical Co., Dept. A-161, 1148 W. Chicago Ave., Chicago 22, Ill.



47 WAYS TO MAKE MONEY

HELPS YOU GET AHEAD
BY SHOWING YOU HOW

REVEALED IN FIRST ISSUE

EVERY ISSUE of "HERE'S HOW" packed jam full of plans, schemes, ideas, that show sure-fire ways to make money—in the home or outside—in full time or spare time. No other magazine like "HERE'S HOW". Stories, articles are practical, factual, inspirational. Any one page in any one issue may well point the way to financial independence and security. Tells how to start a business of your own—with or without capital—and how to make home crafts pay big profits. A single idea in "HERE'S HOW" may be worth \$1,000 to you! Don't miss first issue—just off the press. Send 25c for sample copy. **How Publishing Co., 1512 Jarvis Avenue, Dept. H-38, Chicago 26, Ill.**

BE FIRST

in your locality to cash in on 47 ways to make money. In the first issue of "HERE'S HOW" Only 25c. Hurry!



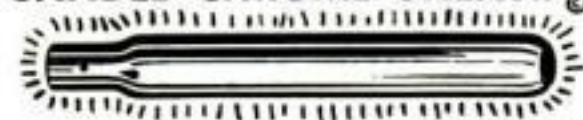
TRAIN

Your VOICE!

RESULTS GUARANTEED

STRENGTHEN your voice this tested, scientific way. Yes—you may now be able to develop the POWER of your speaking and singing voice in the privacy of your own room. Self-training lessons, mostly silent; no music required. Write TODAY for Eugene Feuchtinger's great booklet "How to Strengthen Your Voice." It's absolutely FREE! You must state your age. Booklet mailed in plain wrapper. No salesman will call. Send your name and age RIGHT NOW! **Perfect Voice Institute, 1141 S. Wabash Ave., Studio H-1, Chicago 5, Ill.**

SANDEE CHROME SILENTIP®



\$2.95
EACH

FOR QUIETER PERFORMANCE

An exhaust tailpipe extension that is actually a small muffler. Chrome plated. Will make a sport muffler or dual set quieter and still give straight thru performance.

SANDEE MUFFLER CO., 5643 Corryne Pl., Culver City, Calif.

WAR SURPLUS SALE



\$7.95

F.O.B.
Portland

SLEEPING BAGS Brand new mummy type, 61 1/2" long, 3 pc.—sheet, all wool zipper bag, and water repellent cover. Weight, 5 lbs. Cost Govt. \$15; you buy for less. Price

MACHETTE KNIVES

Brand new, Army, 18" keen-edged, heavy duty blade. Complete with sheath. A real value. P.P.

\$1.95

NAVY PHONES

Brand new, Voice powered, no batteries. Simple hook-up splice 2 wires and talk. Mfg. by RCA. 1 1/2 MILE RANGE. Headset, adj. transmitter, chest plate, switch, 24' cable. No extras to buy. 2 phones complete. P.P.

\$13.95

SEND CASH, CHECK, M. O., 25% DEP. ON C.O.D.'s

GRAND-HAWTHORNE SURPLUS
1439 S. E. Grand Dept. 58 Portland, Oregon



GET
INTO

DIESEL-AUTO

MECHANICS *Master All Phases*

JOBS LIKE THESE ARE AVAILABLE TO TRAINED MECHANICS. CHOOSE THE FIELD YOU LIKE BEST

Get Complete Training

Diesel Fuel Injection
Automotive Motor Tune-up
Diesel Engine Rebuilding
General Garage Mechanic
Agricultural Implements
Auto Engine Rebuilding
Auto Elec. Service
Public Utilities
Parts Dealers
Bus & Truck Lines
Industrial Maintenance
Contracting & Excavating
Business of Your Own
AND MANY other
similar openings.

As a National Schools graduate, you are trained for ALL opportunities in the Diesel & Auto Industries.

EARN WHILE YOU LEARN

With our practical Master Shop-Method Home Training, you study at home in your spare time. You receive Spare Time Work Lessons, which show you how to earn while you Learn... for extra money and experience. You Learn by DOING.

TOOLS AND EQUIPMENT

To make your training complete, we give you selected mechanic's tools and equipment, illustrated below, including all-metal tool-box—as a regular part of your instruction.



Shop-Method Home Training by an Established Resident School Prepares you for Many Good Jobs

Opportunity is everywhere for the trained Diesel - Auto Mechanic. Highways throng with cars, busses, trucks tractors. Garages and Service Stations are kept busy. Factories, ships, farms, railroads, general industry, are dependent upon engine power. Here's a dynamic, fast - growing field that needs trained men who know ALL phases: installation, operation, maintenance and repair. Now—National Schools offers you a practical, all-embracing Diesel-Auto Mechanic's Course, including all of these advantages:

Complete training, covering—Diesels, High Speed and Heavy Duty; Semi-Diesels, Gasoline and Special Fuel Engines AND Allied Mechanics.

Basic Lesson Texts
Diesel Installation
Operation—Maintenance
Diesel Chart Manual
Spare Time Lessons
Engine Service Manuals
Engine Repair
Drive Systems
Diesel Electric Power
Thermodynamics

TOOLS AND EQUIPMENT INVESTIGATE

Secure Full Information

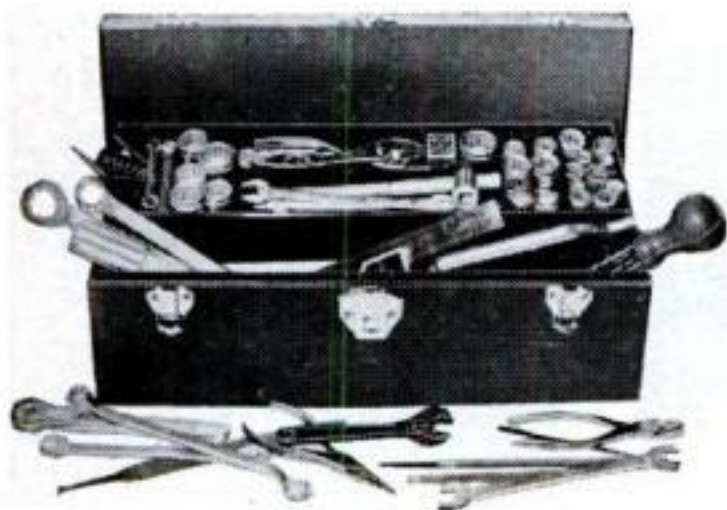
NEW, ILLUSTRATED BOOK & SAMPLE LESSON SHOW HOW WE TRAIN YOU...SEND FOR THEM TODAY!

NO COST NO OBLIGATION

APPROVED FOR VETERANS

Check coupon below

WE GIVE YOU TOOLS OF YOUR TRADE



NATIONAL SCHOOLS

LOS ANGELES 37, CALIF. • EST. 1905

FIND OUT NOW...MAIL COUPON TODAY

NATIONAL SCHOOLS, Dept. PSD-8
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelope or paste on penny postcard)

Mail me FREE the book, YOUR FUTURE IN DIESEL-AUTO MECHANICS, together with the Sample Lesson. I understand I may keep and use the information with no obligation.

Name..... Age.....

Address.....

City..... Zone..... State.....

☐ Check here if Veteran of World War II

NEW AUTOMOTIVE DISCOVERY

FREE TRIAL

IN YOUR CAR!

REPLACES
IDLE ADJUSTMENT
SCREW IN YOUR CARBURETOR
HOLES FOR AIR FLOW



Patent Pending

THE AMAZING NEW GANE "air-flow" NEEDLE

THE OBJECTIVE IS TO GIVE YOUR CAR

- ✓ MORE MILEAGE
- ✓ FASTER PICK-UP
- ✓ EASIER STARTING
- ✓ BETTER IDLING

INSTALL IT YOURSELF in a Few Minutes

ABOUT 1/2 MILLION NOW IN USE!

Up to 25% MORE MILEAGE, EASIER STARTING, FASTER PICK-UP and SMOOTHER IDLING are reported by many users of this new SENSATIONAL Automotive Product. (Hundreds of such letters have already been received.) However, they do not show improvement in some cars—Therefore we want you to try them in your car AT OUR EXPENSE. TRY BEFORE YOU BUY. Just mail card or coupon below and TRY THEM FREE for 10 days. Then check your mileage and engine performance. If satisfied, send only \$1.50 per needle (8 cyl. cars take 2). If not entirely satisfied—just return them and YOU OWE US NOTHING—FAIR ENOUGH? - TRY BEFORE YOU BUY

**MAIL TODAY
SEND NO MONEY
PAY POSTMAN
NOTHING**

NATIONAL AUTOMOTIVE RESEARCH CORP.
Dept. H-8, Venice, California

RUSH Gane "Air-Flow" Needle for my FREE TRIAL. I SEND NO MONEY—I PAY POSTMAN NOTHING. I will try them for 10 days in my car. Then, if satisfied, I will send only \$1.50 per needle (8 cyl. cars take 2). If NOT SATISFIED, I will return them and I OWE YOU NOTHING.

Name _____

Address _____

City _____ State _____

Make of Car _____ Year _____

No. of Cylinders _____ Make of Carburetor _____

INSTALL YOUR OWN LOW-COST TELEPHONE SYSTEMS

SAVE TIME & STEPS

WITH ARMY FIELD TELEPHONES & WIRE

AS LOW AS **\$10.50** PER MILE

Hundreds of uses for quick, dependable communication around home, ranch, industry.

Performance guaranteed to equal present-day commercial telephones. You can use from 2 to 8 phones—any number you may require—on the same line for a complete inter-com system. Simple to install. Just string this low-cost, 2-conductor weatherproof wire and attach to phone terminals. Powered by flashlight cells. No maintenance required.

Ring and talk any distance up to 17 miles!

EE8 FIELD TELEPHONES
Factory Recondi-
tioned—New—each **\$15.00** per pair **\$29.50**

W110B ARMY FIELD WIRE
Just purchased 10,000 miles! New low prices!
Used extensively by Ranchers, Telephone Companies, on Construction Projects, etc., for extended communication systems. 2-conductor, twisted pair.

NEW, unused, excellent condition—per

1/2 Mile (wt. 160 lbs.)	\$13.50
1/2 Mile (wt. 80 lbs.)	\$7.00
600-ft. reels	\$3.00
NEW, unused, good, serviceable condition—per Mile	\$10.50
1/2 Mile	\$5.50

NEW W130 LIGHTWEIGHT 2-CONDUCTOR WIRE

1/2 Mile Reels (2600 ft. illus.) wt. 16 lbs.	\$9.95
1/4 Mile Reels wt. 9 lbs.	\$4.95

All prices FOB Sacramento, No. C.O.D. (Calif. residents add 3% for sales tax.) Small orders sent postage collect, heavy orders freight.

Write for FREE FOLDER—Many More Items! Send Check or Money Order

LORIS SALES P. O. Box 1896-A8 Sacramento, Calif.

CHRONOGRAPH WRIST WATCH

(DELUXE MODEL FORMERLY \$9.95)

LOWEST MARKET PRICE \$7.00



Jewelled Movement; Sweep Second Hand; Precision Workmanship; Rugged Shock-resistant case; Radium hands and numerals; Leather strap. It measures distance, speed of cars, planes, horses and other moving objects. It's a time keeper, stop watch, telemeter, tachometer. ONE YEAR WRITTEN GUARANTEE and full operating instructions enclosed with each watch. SEND NO MONEY. Mail your order today. Pay postman \$7.00 plus 10% Federal tax. Total \$7.70 plus postage. Or send cash (money order or check) with your order and save postage charge. CHROME CASE MODEL AS ILLUSTRATED \$6.50 Plus Tax. Total \$7.15.

MARDO SALES CO., Dept. 1815
480 LEXINGTON AVE. NEW YORK 17, N. Y.

MASTER COURSE IN HYPNOTISM

SECRETS REVEALED!
Actual methods, techniques of master hypnotists . . . how to hypnotize suitable subjects at a glance—a command—by phone! How to control subjects after they awaken—help break tobacco, other habits. Self-hypnosis. Group hypnosis. Entertain with amazing hypnotic stunts for fun or profit. Get this easy-to-understand, how-to-do-it course now! Money-back guarantee. Fully photo-illustrated . . . \$2 (complete). EXTRA! Unique "ALARM-CLOCK MIND" instruction folio and lists of unusual Power Books included. Order "Hypnotism Course" today!

POWER PUBLISHERS, Dept. M7, 790 Broad St., Newark, N. J.

RADIO ENGINEERING

Television, FM, Broadcasting, Servicing, Electronics, Aviation, Marine & Police Radio taught thoroughly. 72 weeks' Engineering course equivalent to 3 years' college radio work. Approved Veteran Training. Catalog upon request.

VALPARAISO TECHNICAL INSTITUTE
Dept. 503 Valparaiso, Ind.

it's fun to earn

RAISING HAMSTERS

Cash in on the growing demand for SYRIAN GOLDEN HAMSTERS recently introduced into the U. S. Ideal pets . . . big laboratory demand. Hardy, clean, odorless. Easily and profitably raised anywhere.

AKOPIAN HAMSTERY
the largest in the West
7358-BC VARNA AVE • NORTH HOLLYWOOD, CALIF.

write for FREE booklet

ELECTRIC MOTOR BARGAINS!

1 HP 3450 RPM	\$34.50
1/2 HP 1750 RPM	\$15
3/4 HP 1750 RPM	\$26
1/2 HP 3450 RPM	\$15
3/4 HP 3450 RPM	\$26

Every Motor Fully Guaranteed
Heavy Duty, Repulsion Induction or Capacitor Types, 110-220 Volts, 60-cycle. Single-phase. Standard Makes (G. E., Wagner, Lealand, Westinghouse, etc.). Rush your order TODAY—large stock of motors—1 & 3 phase. 32-v. direct current bargains. Prices f.o.b.

ROBERTS ELECTRIC CO., 7232 Madison, Forest Park 23, Ill.

BRAND NEW

30 DAY FREE TRIAL

7x50 Prism BINOCULARS

Finest Precision Optics
Buy Direct From Importer
Money Back Guarantee

Many other models AS LOW AS \$6.00 * (* plus 20% fed. tax)

FREE Illustrated Catalog & Book, "How To Select Binoculars"
Dealers: Write for discounts.

BUSHNELL Importers
43 E. Green St. Dept. P-8
Pasadena 1, California

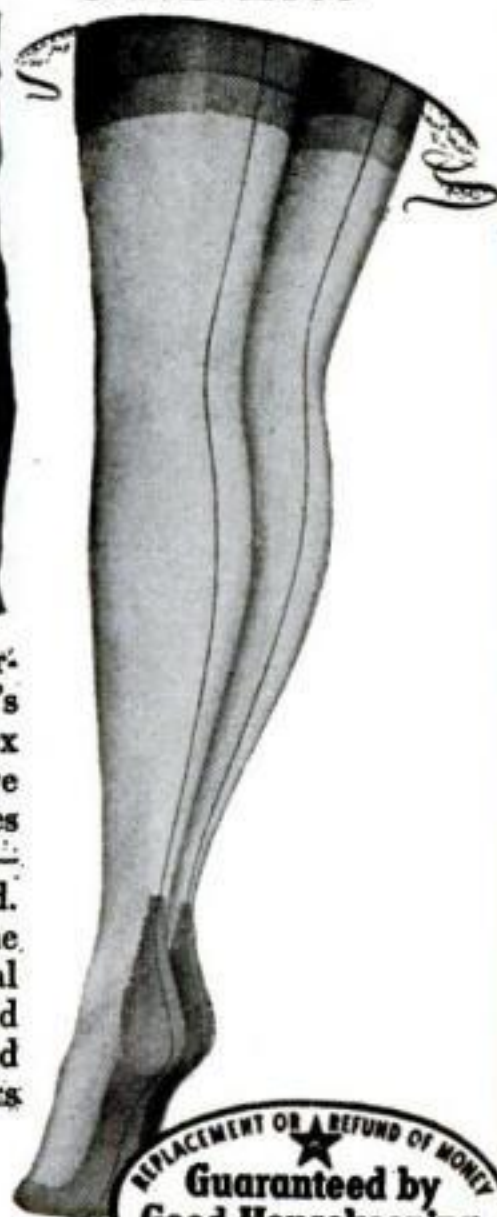
Earn Big Money

WRITING ORDERS

AMAZING NYLONS

Guaranteed Against
RUNS AND SNAGS
Regardless of Cause!

The world's ONLY complete, nationally advertised nylon hosiery line actually guaranteed against runs, snags or excessive wear, **REGARDLESS OF CAUSE!** It's amazing, but true! No matter what the cause—hard use or deliberate abuse—Kendex nylons are replaced **FREE** if they run, snag or become unfit for wear within entire guarantee period! Every weight from sheerest 15 denier to heavy 70 denier—all gauges up to luxury 60 gauge—all sizes, lengths, popular shades, fancy heels, black seams—full fashioned and seamless. Nothing is missing to make sure every woman is pleased. In spite of the amazing guarantee, retail postage prepaid prices start at \$1.08 the pair for sheerest 15 denier 51 gauge. Should free replacement be necessary, actual cost becomes 54¢ a pair! How could any woman possibly resist saving money and solving her hosiery problems? **NOT SOLD IN STORES.** Men and women wanted **NOW**, spare or full time, to write orders and earn big money. You can get orders even if you never sold a thing in your life!



MEN'S HOSE **GUARANTEED 1 YEAR**

Kendex gives you **FOUR** complete lines, including sensational men's hosiery line actually guaranteed for **ONE YEAR!** Any pair not giving satisfactory wear within 12 months is replaced **FREE** without question. All styles, patterns, colors, yarns (including nylon) at lowest prices that mean steady income for you 52 weeks a year.

LINGERIE **HOUSECOATS — ROBES**

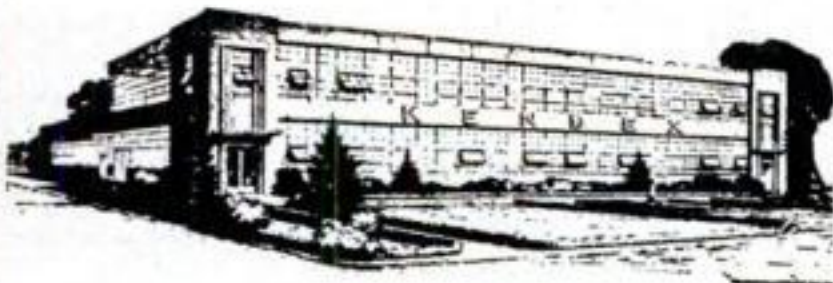
Full line of lingerie, housecoats and robes. Woven and knitted fabrics—rayon, cotton and **NYLON.** Nothing is lacking. Unbelievable prices that defy competition and make women eager to order. Imagine a beautiful all **NYLON** slip, with **NYLON** lace, at \$2.95 or a lace trimmed rayon satin slip at \$1.58! Kendex values sell themselves.

NATIONALLY ADVERTISED

Kendex has advertised in Life, Look, Collier's, McCall's, Saturday Evening Post, Ladies' Home Journal, Good Housekeeping, etc. Carries the Good Housekeeping Guarantee Seal. Thousands of orders shipped daily. Yearly volume in millions. A dependable responsible national organization.

FREE NYLON STOCKING AND MONEY-MAKING OUTFITS

Man or woman — young or old, **YOU** can easily earn steady income, spare or full time. No money or experience needed. We supply **EVERYTHING** free and set you up in business at **OUR** expense. Nothing to buy or deliver. Write orders. we deliver and collect. Big advance pay plus huge cash bonus that increases your earnings up to 40%! Your name and address on postcard will bring you sample nylon stocking; samples of lingerie, hose, robe materials; self-selling sales books with **FULL COLOR** illustrations; 36-page sales manual showing you easy steps to success; color cards, free "door openers" worth \$1 each but which you give away free; special plan to have others sell for you, etc., etc. You can start making money the minute you receive the complete **FREE** outfits!



YOUR COST ONE CENT!

SEND NO MONEY. Pay nothing now or later. No obligation. Not even a promise to return outfits. Simply write your name and address on a penny postcard and mail to us. We'll immediately rush you everything you need **FREE** and postage prepaid. **WRITE TODAY!**

KENDEX CORPORATION • BABYLON 349, N. Y.

3 TRADES IN 1 CAREER

Secures Your Future



WATCHMAKING • JEWELRY- ENGRAVING • STONE SETTING •

Each trade can be a full-time job; together they assure numerous high paying opportunities, or a business of your own. Profit by the *Nationally Recognized Training Methods* of the *Kansas City School of Watchmaking*.

FALL AND WINTER CLASSES NOW ENROLLING

Clip and Mail this Coupon Today

KANSAS CITY SCHOOL OF WATCHMAKING
1218 Admiral Blvd.
Kansas City 6, Missouri

Please send me, without obligation, complete information on training in the above courses.

Name _____

Street _____

City _____ State _____

☐ Check if Veteran ☐ G. I. Approved

ELECTRIC SHEAR SHARPENER

Over 65,000 Sold—It Must Be Good!



Genuine Carborundum wheel ideal for shop or home use. Send remittance with order and shipment will be made at once, prepaid to your door, complete with electrical goods catalogue. Motor driven

\$9.75

complete with vise

WILLIAM MARVY COMPANY, Dept. 8
479 St. Peter Street St. Paul 2, Minn.

HOUSE PLANS



275 BEST

DESIGNS — IDEAS — showing photographs of homes actually built; descriptions, floor plans, 1 & 2 story. All types architecture. Complete blueprint plans available. Circle your choice of books — 50c each:

- Selected Homes, 40 CALIFORNIA RANCH, Monterey.
- Dream Homes, 79 Illustrations, Interiors and Exteriors.
- Charming Homes, 31 5-Rooms, Modern Exteriors.
- Attractive Homes, 40 Cape Cods and Colonials.
- Small Homes, 23 Attractive "Budget" Designs.
- Brick Homes, 62 2-3-4 Bedrooms.
- ALL 6 BOOKS FOR \$2.50 POSTPAID



38 BARBECUE FIREPLACES 60c

Book Shows Photos — Plans

- ALL 7 BOOKS FOR \$3.00 POSTPAID
- No C.O.D.'s please. Money-back guarantee.

CLEVELAND PUBLICATIONS, INC.

Dept. 8F 369 W. Washington, Pasadena 3, Calif.

SPEED AND CUSTOM EQUIPMENT SAVE UP TO 50% NEW—POPULAR MAKES—GUARANTEED

Check These Amazing Low Prices

Straight-through MUFFLERS.....\$ 4.25
Ford or Merc. 1932-48 Dual INTAKE
MANIFOLD 25.50
Fender SKIRTS (all cars).....pair 7.95
Lowering SHACKLES Ford or Merc. set .50

One of the West's largest lines of Speed And Custom Equipment. We buy in huge volume. Manufacturers' Representative Discounts—have very low overhead—no salesman—Sell only by mail. **These Savings Are Passed On To You.** Absolutely guaranteed. **Absolutely LOWEST PRICES** on all speed equipment.

CATALOG FREE—Please enclose 25c to cover handling & mailing costs.

MAIL-WAY AUTO SUPPLY

Box 349, Dept. PS-8, HOLLYWOOD 28, CALIF.

**FREE
LARGE
CATALOG**



URANIUM DETECTOR!



Lowest Price in Field GEIGER COUNTER

For Radioactive Mineral Prospecting

Ready to Operate **\$32.50**

Write for complete information

ALPHA NUCLEAR LABORATORIES
Box 649-A, Asbury Park, N. J.

COMMERCIAL TRADES' GRADUATES GET

THE BETTER JOBS because they are PROPERLY TRAINED!

Practical Shop Training In
Air Conditioning—Refrigeration
and/or

Electricity Major Appliances
Service, Maintenance & Installation

Write for Catalog PS4

COMMERCIAL TRADES INSTITUTE

200 South 20th St. Birmingham, Ala.
Member: Southern Association of Private Trade Schools
An approved school to TRAIN Veterans & Non-Veterans



CONVERT 1/4" DRILL TO 1/2"

The WOODCHUCK 3-jaw precision chuck converts any 1/4" electric drill to 1/2" capacity. Takes twist drills, router bits, reamers and spur bits for holes up to 1 1/4" in wood. Washers fit removable arbor for buffing, grinding, wire brushing. Money back guarantee. Send check or money order to:

\$1.95
POST PAID.

DOUGLAS MANUFACTURING CO.
2307 Westgate Drive, Houston 19, Texas

ARMY SURPLUS BARGAINS

FOR THE HOME — SHOP — HANDYMAN

Send for our FREE catalog of Surplus Bargains. All NEW top-quality merchandise. Buy from Army Surplus Sales of Fresno—and save! Also big stock of brand-new home utility power hand-tools, drills, saws, etc. All products of Black & Decker. Tremendous buying power and low overhead means lowest prices.

ARMY SURPLUS SALES OF FRESNO—Dept. 18
1820 Tulare Street Fresno, California
THE FRESNO HARDWARE COMPANY

Be A MASTER PLUMBER

Earn \$15 To \$50 A Day

DON'T ENVY THE PLUMBER—BE ONE

Every skilled workman will tell you that Plumbers have the best of it. WINTER and SUMMER the Plumber is busy at top wages. No skilled Plumber is ever out of a job—compare his opportunities with any trade, plus the opportunities of having your own shop. We teach you Plumbing with TOOLS (not books) under Licensed Master PLUMBERS in one of the finest equipped schools in America. We make you a Plumber, every branch is taught thoroughly—Lead Work—Blueprint for plan reading—all other tricks.

LEARN IN 32 WEEKS WITHOUT PREVIOUS EXPERIENCE

If you like to work with tools you owe it to yourself to investigate. No need to ever work as an apprentice. Get free bulletin. Write now! G.I. APPROVED. Our 24th year.

UNIVERSAL PLUMBING SCHOOL
819 HOLMES STREET KANSAS CITY, MO.

Specialize in These Expanding Fields—

➤ AIR CONDITIONING ➤ HEATING ➤ REFRIGERATION



In 6 to 24 months you can prepare for a substantial opportunity in industry or a business of your own. This 47-year-old school of technology offers world-famous training programs in these fascinating fields. Experts from private business cooperate with faculty specialists to keep courses geared to latest developments. Laboratories and shops are well equipped. Specialized technical training is coupled with solid education in basic sciences and related arts. You pass step-by-step to certificates of "Refrigeration Serviceman" in 6 months — "Refrigeration and Heating Serviceman" 6 months later — "Refrigeration, Heating, Air Conditioning Technician" in 12 additional months.



Courses Offered by This College and Technical Institute

SERVICE — 6 to 12 months
• Electricity • Welding
• Refrigeration, Heating

TECHNICIAN—12 to 24 mo.
• Radio — Television •
Electronics • Electro-
technics • Refrigeration,
Heating, Air Condition-
ing • Welding

PROFESSIONAL—36 months
• Electrical Engineering
(Major in Electronics or
Power) — B. S. Degree

— Alma mater of 35,000
— Terms start Oct., Jan.,
April, July



WRITE FOR NEW,
comprehensive, "Oc-
cupational Guidance"
pamphlet on Refrig-
eration, Heating and
Air Conditioning —
plus 44-page "Your
Career" bulletin.
Free!

MILWAUKEE SCHOOL of ENGINEERING

Technical Institute • College of Electrical Engineering

MILWAUKEE SCHOOL OF ENGINEERING

Dept. PS-850, N. Broadway and E. State, Milwaukee, Wis.

Send me free "Occupational Guidance" pamphlet and
44-page "Your Career" bulletin. I am interested in course

on.....

NAME.....AGE.....

ADDRESS.....

CITY.....ZONE...STATE.....

☐ Check if World War II Veteran

BE A PHOTO-ENGRAVER

We furnish complete equipment and sup-
plies. Learn at home or in our modern, friendly
APPROVED school in MISSOURI. Get into this
big demand, high profit, high wage field. You
can start your own profitable, full time or part
time PHOTO-ENGRAVING business right in
your own home.

Be independent, be your own boss or pave
the way to a high pay job with experience
gained in your own shop.

TASOPÉ TRAINING and TASOPÉ EQUIP-
MENT has enjoyed world wide recognition
since 1931. Write for descriptive literature
today. No obligation.

THE AURORA SCHOOL OF PHOTO-ENGRAVING, DEPT. PS-8 TASOPÉ BLDG., AURORA, MO.

LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation



The steady dependable trade of Meat Cutting taught
easily in 8 short weeks. You LEARN BY DOING
under actual meat market conditions in big modern
school at Toledo.

For beginners or men with experience. Get a profit-
able store of your own. Remember, PEOPLE MUST
EAT! Big pay jobs. Free employment help. Thousands
of successful graduates.

Buying, cutting, percentage, pricing, advertising, sell-
ing, etc. A complete retail meat education. National
School established over 25 years. Get National train-
ing NOW. Pay your tuition in easy weekly payments

after you graduate. G. I. approved. Send coupon for
FREE 52 page school catalog—TODAY.

National School of Meat Cutting, Inc.
Dept. 51-H, Toledo 4, Ohio

Send me your FREE school catalog on National Training at Toledo
in Meat Cutting, Meat Merchandising and Self Service Meats. No
obligation. No salesmen will call.

Name.....

Address.....

City.....State.....

() Check here if Veteran of World War II

EARN MORE IN DRAFTING



MORE OPPORTUNITIES for EMPLOYMENT and PROMOTION

"Here I am at work making good money as a draftsman. I'm glad I sent the coupon to Chicago Tech for that Free Trial Lesson and found out how easy it is to learn Drafting in spare time at home. Today I feel secure in my job because the draftsman's work comes first on any new project. And, in addition, draftsmen can't be replaced with machines. What's more, I feel I'm slated for promotion and more pay, because I see so many draftsmen advancing to high pay jobs."

LEARN IN SPARE TIME—AT HOME!

(or at the College in Chicago)

A few hours of pleasant home study every week—that's all. No interference with your present job. All the tools you need; drawing outfit included. With Chicago Tech's help, you train yourself step by step. This tested method—developed over 46 years of C.T.C. progress—prepares men quickly for good positions in industry.



FREE INFORMATION—SEND COUPON

To prove to you how easy it is to learn Drafting at home by the Chicago Tech method, we will send you this FREE TRIAL LESSON. No charge for this lesson, now or later. Fill out and mail coupon, or send post card today.

CHICAGO TECHNICAL COLLEGE

K-227 Tech Bldg., 2000 So. Michigan Ave.

Chicago 16, Illinois

Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name.....Age.....

Address.....

City.....Zone...State.....

LAW FREE BOOK



Your FREE copy of "The Law-Trained Man" shows how to gain prestige and greater earnings through Blackstone home law study. All instruction material furnished including 18-volume Law Library written by 65 well-known law authorities. Lawyers, judges among our graduates. LL.B. degree. Low cost; easy terms. Write today.

BLACKSTONE COLLEGE OF LAW Dept. 120C, Chicago I, Ill.
225 N. Michigan Ave.
A Correspondence Institution Founded in 1890

FREE



A NEW HOME INDUSTRY



Let us show you how extremely easy and PROFITABLE it is to make beautiful and useful things out of LIQUID PLASTICS, LIQUID MARBLE, LIQUID IVORY, LIQUID GLASS, CERAMICS, ETC. . . . as easy as pouring water out of a glass! Make novelties, jewelry, gifts, artware, toys, tools, dies, gadgets, ceramics . . . a million useful things! We supply everything—MATERIALS, INSTRUCTIONS and BUYERS! Send only 25c for 1. Big catalog of 300 casting materials, molds and accessories. 2. A beautiful CASTING free (to show you what you can do), and 3. Actual INSTRUCTIONS on how to cast and start in the CASTING BUSINESS! VALUABLE MOLDS given FREE with orders! Send 25c today—this may be the lucky coin that will start the most fascinating and profitable phase of your life.

PLASTICAST COMPANY (DEPT. A)

170 N. Halsted St. (Write to nearest address) P. O. Box 987
Chicago 6, Ill. Palo Alto, Calif.
CANADIAN CUSTOMERS, please order directly from: CANADIAN INDUSTRIAL PLASTICS, LTD., 1056 1/2 Pender West, Vancouver, B.C.

ATTENTION LEATHERCRAFTERS

LOOK WEST, to the home of Leather Carving and Stamping. More than 100 LEATHERCRAFT KITS in finest Tooling and Carving Leathers. Best assortment of tools and accessories in U.S.A. Other handcraft materials also. Send 10c for 96-page illustrated catalog.

GRIFFIN CRAFT SUPPLIES (since 1924)

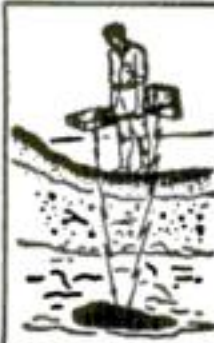
5626-B Telegraph Avenue

Oakland 9, California

NERVOUS STOMACH

ALLIMIN relieves distressing symptoms of "nervous stomach"—heaviness after meals, belching, bloating and colic due to gas. ALLIMIN has been scientifically tested by doctors and found highly effective. More than a 1/4 billion sold to date. Money-back guarantee. At all good drug stores.

ALLIMIN Garlic Tablets



Treasure and Mineral LOCATORS GEIGER-COUNTERS

PURCHASE ON MONTHLY PAYMENTS

FREE LITERATURE

FISHER RESEARCH LABORATORY Inc.,
Palo Alto, Calif.

HIGHEST ROYALTIES and CASH

FOR YOUR INVENTIONS

(Patented and Patent Pending only)

Write for FREE booklet without obligation

UNIVERSAL MARKETING CO

354 S. SPRING ST. (Suite C)

LOS ANGELES 13, CALIF.

You are in demand *if you can draw!*



If you like to **DRAW, SKETCH,**
or **PAINT,** write for **TALENT**
TEST. NO FEE!

ART INSTRUCTION, INC.

Dept. 8140 • Minneapolis 15, Minnesota

Please send me your **FREE Talent Test.**

Name _____ Age _____

Occupation _____ Phone _____

Address _____ City _____

Zone _____ County _____ State _____

MAKE MONEY WITH YOUR BRUSH AND PEN!

Learn this Profitable Profession

**IN 90 DAYS
AT HOME**

Money-Making Career Open to Men and Women, 18 to 50

Hundreds of men and women between 18 and 50 make \$10 to \$20 in a single day giving scientific Swedish Massage and Hydro-Therapy treatments. There is big demand from doctors, hospitals, sanatoriums and clubs. Graduates earn large full time incomes from these or in private practice in their own offices. Others make good money from home treatments given in spare time. Learn this interesting, money-making profession in your own home, through our home study course. Same instructors as in our nationally known resident school. You can win independence and prepare for future security by qualifying for your Diploma. Course can be completed in 3 to 4 months. Many earn while they learn. Begin your training at once.

Anatomy Charts & Booklet FREE

Enroll now and we will include, at no extra cost, many needed supplies. Fit yourself to help meet growing demand for Scientific Swedish Massage. Send the coupon at once for complete details, Anatomy Charts and 32-Page Illustrated Booklet, **FREE, postpaid.**



THE COLLEGE OF SWEDISH MASSAGE
Dept. 070K, 41 E. Pearson, Chicago 11

Please send me **FREE** and postpaid, Anatomy Charts, 32-page Booklet and complete details on Home Training.

Name _____ Age _____

Address _____

City _____ State _____

**AUTO
MECHANICS**

**BODY-
FENDER
REPAIR**

**DIESEL
MECHANICS**

**ELECTRIC-
ITY**

**REFRIGER-
ATION**

STILL LOOKING FOR THE RIGHT SPOT?

Train for Success thru C.T.I.

**RADIO-
TELEVISION**

**MECHANICAL
DRAFTING**

**BUILDING
CONSTRUC-
TION**

**FACTORY
MANAGE-
MENT**

**HIGH
SCHOOL**

Want a better job or quick promotions? C.T.I. trains you at home in spare time, or in our big resident school. Mail coupon for valuable booklet on your opportunities.

COMMERCIAL TRADES INST.

1400 Greenleaf, Dept. E1-8

Chicago 26 ☐ Veteran ☐ Non-Vet.

Name _____ Age _____

Address _____

City & State _____

Course _____



**YOU
can
acquire**

LAW NIGHTS AT HOME! L.L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction... you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY A Correspondence Institution

417 S. Dearborn St. Dept. 883-L Chicago 5, Ill.

Send me your two FREE booklets described above, without obligation.

Name.....Age.....

Street.....

City, Zone & State.....



MECHANICAL DENTISTRY

To make Crowns, Plates, Bridgework, etc., for Dentists. Easy practical way to learn mechanical dentistry at home in spare time. FULL EQUIPMENT OF TOOLS AND MATERIALS INCLUDED WITH COURSE. Low tuition. Easy terms. Write for FREE BOOK about this money making profession that is not affected by the machine age.

McCARRIE SCHOOL of Mechanical Dentistry
207 N. Broad St. Dept. 900 Philadelphia, Pa.

WHAT IS YOUR IDEA OF A GOOD JOB?

Do you want independence... good pay... a chance to become one of your town's most respected citizens? Would you like to *know* that your skill is your security as long as you live? These are a few of the advantages of Watchmaking, the mechanical profession that has been called "depression-proof" by unbiased national authorities.

Don't wait for "breaks" that never come; learn the facts *now* about real opportunities ahead for our skilled graduates. Our 32-page catalog will tell you all about outstanding GI-approved courses in master watchmaking, chronograph watch repair and jewelry engraving. Write today!

WESTERN PENNSYLVANIA HOROLOGICAL INSTITUTE, INC.
Desk A-42, 706 Smithfield St. Pittsburgh 19, Pa.

PRINT YOUR OWN POST CARDS

**COMPLETE
OUTFIT
only
\$7.50**



Amazing results in sales, inquiries and contacts... saves time and money... very easy to use GEM STENCIL DUPLICATOR is ideal for Advertising, Announcements, Notices, Labels, Forms, Price Lists—hundreds of uses for every type of business and organization. Comes complete with all supplies, instructions and 60-page Book of Ideas.

FREE TRIAL OFFER: Try it before you buy it! Write and a GEM OUTFIT will be sent you postpaid. After 10 days, send only \$7.50 or return the GEM, no questions asked. The GEM must sell itself; you be the judge.

BOND EQUIPMENT CO. • Dept. 151
6633 Enright • St. Louis 5, Mo.

SEND NO MONEY • FREE TRIAL OFFER

LEARN TO WRITE a Good Hand!

FOR BUSINESS AND SOCIAL SUCCESS!

Improve your handwriting at home quickly with my new instruction books just off the press. Master all the secrets of better penmanship. Simple and easy, fully illustrated, highly endorsed. Begin today. Write for: ☐ New Free Book, "How to Become a Good Penman", or check books wanted, \$1.00 each. ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Engraving Alphabets ☐ Bird and Design Flourishing ☐ Complete Set \$4.50 ☐ Enclose 10c for your name beautifully written and shading penpoint. S. A. Ziller, President, TAMBLYN SCHOOL OF PENMANSHIP 439 Ridge Bldg. In Business Over 52 Years Kansas City, Mo., U.S.A.



BE A LOCKSMITH

**Learn Locksmithing and Keymaking from
Experts in Your Spare Time at Home!**

Locksmiths in big demand! No layoffs, no slow seasons! Age or physical handicap no disadvantage. Year-round, steady income in this permanent, respected field. Full or part time. Practical, illustrated lessons show you how to make money even while learning! All materials and special tools supplied. Send for FREE BOOKLET.

LOCKSMITHING INSTITUTE, Dept. PS-8
55 Park Ave. Rutherford, N. J.

**NATION'S
LARGEST
EXCLUSIVE
ELECTRICAL
SCHOOL**

"LEARN-BY-DOING"

ELECTRICITY

**PRACTICAL TRAINING
NOT "HOME STUDY"**

Get actual experience in great shops of M.T.I. Learn all phases Practical Electricity; Housewiring, Motors, Const., Maintenance, etc. Living arrangements, Part-time jobs, etc. Pay after graduate plan.

A post card brings the story.
MICHIGAN TECHNICAL INSTITUTE, Dept. PS-8
2281 W. Fort St., Detroit 16, Michigan

RUPTURED?

Get Relief This Proven Way

Why try to worry along with trusses that gouge your flesh—press heavily on hips and spine—enlarge opening—fail to hold rupture? You need the Cluthe. No leg-straps or cutting belts. Automatic adjustable pad holds at real opening—follows every body movement with instant increased support in case of strain. Cannot slip whether at work or play. Light. Waterproof. Can be worn in bath. Send for amazing FREE book, "Advice To Ruptured," and details of liberal truthful 60-day trial offer. Also endorsements from grateful users in your neighborhood. Write:

CLUTHE SONS, Dept. 14, Bloomfield, New Jersey

5 YEAR WRITTEN GUARANTEE BULOVA 15 & 17 JEWEL

Originally \$59.50
Sold up to

Also

- Benrus
- Gruen
- Waltham or
- Elgin Watches

Choice \$16.95



ONLY
\$16.95
Plus \$1.70
Tax

Genuine Bulova, Benrus, Gruen, Waltham, Elgin and other famous wrist watches in latest style Yellow Gold Cases. You get these unredeemed 5-year guaranteed lifetime quality **FAMOUS MAKE-WATCHES** now at truly enormous savings because we bought out **SURPLUS STOCKS** of leading New York and Maryland Jewelers. Order now while they last. State make preferred. Order men's or ladies'.

TRIAL OFFER! WEAR AT OUR RISK! Money back in 5 days if not delighted! SEND ONLY \$1 down payment with order. Pay balance to postman on arrival plus postage. Or we pay postage if you enclose \$16.95, plus \$1.70 tax.

FREE! HANDSOME EXPANSION BAND INCLUDED WITH PREPAID ORDERS. Order now!

MARYLAND DISTRIBUTORS, Dept. 104
501 E. Baltimore St. Baltimore 2, Md.

Free Folder: America's Best Watch and Diamond Ring Values. Practically Wholesale Prices to User Direct.

15 or 17 JEWEL WRIST WATCHES

Water-resist,
Shock-protected
with Swiss
Precision
Movement

Originally \$30
OUR PRICE NOW
\$9.95
Plus \$1 Tax

'How to Make Money with Simple Cartoons'



A book everyone who likes to draw should have. It is free; no obligation. Simply address

**FREE
BOOK**

CARTOONISTS' EXCHANGE

Dept. 198-D Pleasant Hill, Ohio

Learn PHOTOGRAPHY at Home

Splendid Hobby or Vocation

Prepare in spare time. Practical basic training. Long-established school. Send for free booklet, "Opportunities in Modern Photography" and particulars. Sent postage prepaid. No obligation.

AMERICAN SCHOOL OF PHOTOGRAPHY

1315 S. Michigan Avenue, Dept. 136C Chicago 5, Illinois

REAL ESTATE BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! No obligation. Graduates report making substantial incomes. Start and run **your own business quickly**. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in our classrooms in big cities. Diploma awarded. G.I. approved. Nationally known.

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)

15 E. Pershing Road, Dept. PS, Kansas City, Mo.

**FREE
BOOK
TELLS
HOW**

BECOME A JET ENGINE EXPERT

**BE READY
Start NOW**

Aviation's **NEWEST OPPORTUNITY** - Study with **LIVE JETS** at CAL-AERO only - **AERONAUTICAL ENGINEERING & MASTER AVIATION MECHANIC** training since 1929 - Approved for **VETERANS**.
WRITE TODAY for Special Information.

NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

CAL-AERO TECHNICAL INSTITUTE
GRAND CENTRAL AIR TERMINAL • GLENDALE 1, CALIFORNIA

PS-8

WHAT EVERY MECHANIC WANTS TO KNOW

1800
PAGES



This Big Practical Book gives full information with working diagrams covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

Diesel Engines, Hydramatic and Fluid Drives Fully Explained.

A complete Guide of 1800 pages, with over 1500 illustrations showing inside views of the working parts, with instructions for service jobs.

IT PAYS TO KNOW

How to fit pistons—How to locate engine knocks—How to fit connecting rod bearings—How to service main bearings—How to re-condition valves—How to time valves—How to adjust fan belts—How to adjust carburetors and

chokes—How to rebuild a clutch—How to service automatic transmissions—How to service brakes—How to adjust steering gear—How to cope with ignition troubles—How to service distributors—How to time ignition—How to "tune up" an engine.

\$4 COMPLETE • PAY \$1 A MO.
TO GET THIS ASSISTANCE FOR YOURSELF SIMPLY FILL IN AND MAIL COUPON TODAY.



Step up your own skill with the facts and figures of your trade. Audel's Mechanics Guides contain Practical Inside Trade Information in a handy form. Fully illustrated and Easy to Understand. Highly Endorsed. Check the book you want for **7 DAYS FREE EXAMINATION**. Send No Money, Nothing to pay Postman.

CUT HERE



**Check
NOW!**

You Can
Look Over
Any Guide
In Your
Own Home

Start the
Easy Pay-
ments If
Satisfied

**MAIL
THIS
TODAY**



AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for **FREE EXAMINATION** books marked (X) below. If I decide to keep them I agree to mail \$1 in 7 Days on each book or set ordered and further mail \$1 monthly on each book or set until I have paid price, otherwise I will return them.

- | | |
|--|-----|
| <input type="checkbox"/> AUTO MECHANICS GUIDE, 1800 pages | \$4 |
| <input type="checkbox"/> DIESEL ENGINE MANUAL, 400 Pages | 2 |
| <input type="checkbox"/> WELDERS GUIDE, 400 Pages | 1 |
| <input type="checkbox"/> MACHINISTS Handy Book, 1600 Pages | 4 |
| <input type="checkbox"/> POWER PLANT ENGINEERS Guide, 1500 Pages | 4 |
| <input type="checkbox"/> ENGINEERS & FIREMANS EXAMS, 528 Pages | 1 |
| <input type="checkbox"/> PUMPS, Hydraulics & Air Compressors, 1658 Pgs. | 4 |
| <input type="checkbox"/> MARINE ENGINEERS Handy Book, 1280 Pages | 4 |
| <input type="checkbox"/> ENGINEERS & Mechanics Guides (8 Book Set) | 12 |
| <input type="checkbox"/> Answers on Practical ENGINEERING, 254 Pages | 1 |
| <input type="checkbox"/> ELECTRIC WIRING DIAGRAMS, 210 Pages | 1 |
| <input type="checkbox"/> ELECTRICIANS EXAMINATIONS, 250 Pages | 1 |
| <input type="checkbox"/> ELECTRICAL DICTIONARY, 9000 Terms | 2 |
| <input type="checkbox"/> ELECTRIC MOTOR GUIDE, 1000 Pages | 4 |
| <input type="checkbox"/> HANDY BOOK OF ELECTRICITY, 1440 Pages | 4 |
| <input type="checkbox"/> ELECTRICAL POWER CALCULATIONS, 425 Pgs. | 2 |
| <input type="checkbox"/> RADIOMANS GUIDE, 975 Pages | 4 |
| <input type="checkbox"/> ELECTRONIC DEVICES, 216 Pages | 2 |
| <input type="checkbox"/> ELECTRIC LIBRARY, 7000 Pages (12 Book Set) | 18 |
| <input type="checkbox"/> Vols. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII \$1.50 Ea. | |
| <input type="checkbox"/> OIL BURNER GUIDE, 384 Pages | 1 |
| <input type="checkbox"/> HOUSE HEATING GUIDE, 1000 Pages | 4 |
| <input type="checkbox"/> CARPENTERS & Builders Guides (4 Book Set) | 6 |
| <input type="checkbox"/> PLUMBERS & Steamfitters Guides (4 Book Set) | 6 |
| <input type="checkbox"/> MASONS & Builders Guides (4 Book Set) | 6 |
| <input type="checkbox"/> BLUE PRINT READING, 416 Pages | 2 |
| <input type="checkbox"/> PAINTERS & DECORATORS MANUAL, 450 Pgs. | 2 |
| <input type="checkbox"/> GARDENERS & GROWERS Guides (4 Book Set) | 6 |
| <input type="checkbox"/> REFRIGERATION & Air Conditioning, 1280 Pgs. | 4 |
| <input type="checkbox"/> SHEET METAL WORKERS Handy Book, 388 Pgs. | 1 |
| <input type="checkbox"/> SHEET METAL PATTERN LAYOUTS, 1100 Pgs. | 4 |
| <input type="checkbox"/> AIRCRAFT WORKER, 240 Pages | 1 |
| <input type="checkbox"/> MECHANICAL DRAWING GUIDE, 160 Pages | 1 |
| <input type="checkbox"/> MECHANICAL DRAWING & DESIGN, 480 Pgs. | 2 |
| <input type="checkbox"/> MATHEMATICS & CALCULATIONS, 700 Pgs. | 2 |
| <input type="checkbox"/> MECHANICAL Dictionary, 968 Pages | 4 |
| <input type="checkbox"/> MILLWRIGHTS & Mechanics Guide, 1200 Pgs. | 4 |

Name _____

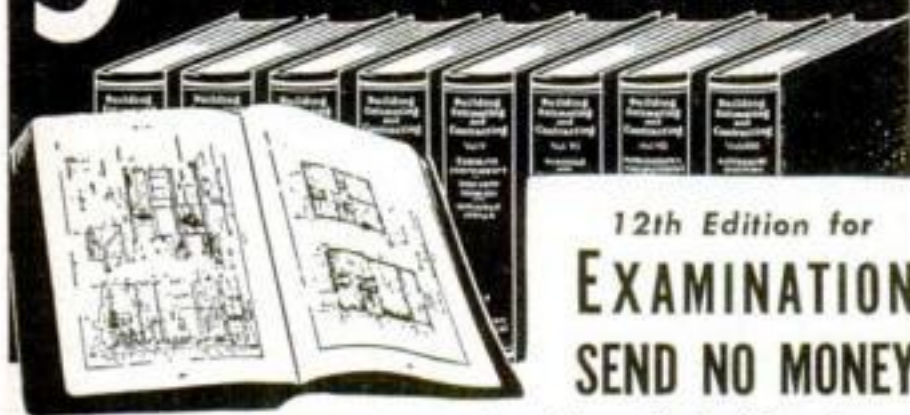
Address _____

Occupation _____

Employed by _____

33

9 BIG BUILDING BOOKS



12th Edition for
EXAMINATION
SEND NO MONEY

Learn to draw plans, estimate, be a live-wire builder, do remodeling, contracting. These 9 practical, profusely illustrated books cover subjects that will help you to get more work and make more money. Masonry, concrete forms, carpentry, steel square, roof framing, construction, plumbing, heating, painting, decorating and many other subjects. More than 4000 pages—2750 illustrations.

BETTER JOBS—BETTER PAY

A nationwide building boom is in full swing and trained men are needed. Big opportunities are always open for MEN WHO KNOW HOW. These books supply quick, easily understood training and handy, permanent reference information that helps solve building problems.

UP-TO-DATE EDITION

These books are the most up-to-date and complete we have ever published on these many subjects.

Coupon Brings Nine Big Books For Examination

AMERICAN TECHNICAL SOCIETY — Publishers since 1899
Dept. GC-20 Drexel at 58th Street Chicago 37, Ill.

You may ship me the Up-to-Date edition of your nine big books, "Building, Estimating and Contracting," without any obligation to buy. I will pay the delivery charges only, and if fully satisfied in ten days, I will send you \$3.00, and after that only \$4.00 a month, until the total price of only \$34.80 is paid. I am not obligated in any way unless I keep the books.

Name.....

Address.....

City.....State.....

Please attach a letter stating your age, occupation, employer's name and address, and name and address of at least one business man as a reference. Men in service, also please give home address.

HANDBOOK OF AIRPLANE MAINTENANCE & OPERATION

Easy self-study course and up-to-date reference manual in one low-priced book! Covers basic principles and functions, construction, repair and maintenance of every part of the modern airplane. 512 pages, 600 pictures, over 300,000 words! 2,500-item index! Specification data sheets of world's leading types of aircraft. Only \$5.00—refunded if not fully satisfied after week's trial.

NATIONAL AERONAUTICS COUNCIL, Inc., Dept. 808
37 West 47th Street New York 19, N. Y.

TRI-STATE COLLEGE

FOUNDED 1884

Time tested, world famous accelerated B.S. Degree courses in Civil, Elect., Mech., Chem., Aero., and Radio and Telev. Engineering; Bus. Adm. and Acct. May be completed in 27 months. Also 36 weeks courses in Surveying, Drafting. For ambitious, earnest students. Preparatory Dept. for those who lack required high school work. G.I. approved. Visit campus, see well equipped labs. Low cost. Personalized instruction. World-wide student body. Grads successful. Enrollment limited to 1600. Enter Sept., Jan., March, June. Write for Catalog.

580 College Avenue Angola, Indiana



B. S. DEGREE IN 27 MONTHS
•
World Wide Enrollment

Command Bigger Money! STUDY LAW

STUDY AT HOME for BUSINESS SUCCESS and LARGER PERSONAL EARNINGS. 40 years expert instruction—over 114,000 students enrolled. LL.B Degree awarded. All text material furnished. Easy payment plan. Send now for FREE BOOK—"Law and Executive Guidance." It explains the course—how you may enroll and the many ways you may profit from Law Study. Write TODAY to:

AMERICAN EXTENSION SCHOOL OF LAW

Dept. 29-PS 646 N. Michigan Ave., Chicago 11, Ill.

STUDY AT HOME

WITH AN EDUCATIONAL INSTITUTION

Courses in ENGINEERING: Electrical, Civil, Mechanical, Drafting, Architectural, Automotive, Steam, Diesel, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Marine, Refrigeration, Air Conditioning, Chemical.

Courses in ARTS AND SCIENCES: Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture. Send for free catalog.

McKinley-Roosevelt Incorporated, 4610-A3, Sheridan Rd., Chicago 40, Illinois

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. 1/2c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. Big chain store orders now being placed. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

LEARN MEAT CUTTING

At Home—In Spare Time

Get into the vital meat industry. Concise, practical Home Training based on 25 years proven instruction methods used at National's famous resident school. Prepares you for bigger pay as Meat Cutter, supervision, market manager or more money in your own store. Go as rapidly as your spare time permits. Diploma. Start NOW to turn your spare hours into money. Send for FREE bulletin today. No obligation.

National School of Meat Cutting Inc., Div. O-93, Toledo 4, Ohio

LET ME PROVE I CAN MAKE YOU A NEW MAN

Just tell me where you want handsome, powerful muscles. Are you fat and flabby? Or skinny and gawky? Are you short-winded, peppy? Then write for my 48-page FREE BOOK, about "Dynamic Tension", and learn how, in only 15 minutes a day, I can make you a healthy, confident, powerful HE-MAN.

CHARLES ATLAS,
115 E. 23rd St.,
Dept. 18, New York,
N. Y.

Charles Atlas
winner of title
"World's Most
Perfectly De-
veloped Man"

IMAGINE THEIR JOY when they found they could play this easy-as-ABC way!



LEARNED QUICKLY AT HOME
 "I didn't dream I could actually learn to play without a teacher. Now, when I play for people they hardly believe that I learned to play so well in so short a time."
 *H.C.S., Calif.



PLAYS AT DANCES
 "Your lessons have been most satisfactory. I can play all of the popular songs. I have earned money playing at dances."
 *E.N.J., New York.



PLAYS ON RADIO
 "I can't keep from telling you that I have a good position playing from KTHS, Hot Springs, Ark., every morning."
 *J.S., Okla.

What Instrument Would You Like to Play?

JUST name your instrument and we'll show you how you can learn to play it—quickly, easily, in spare time at home. Never mind if you don't know one note of music from another—don't worry about "special talent." And forget all you've ever heard about music being hard to learn.

The truth of the matter is that *thousands now play who never thought they could!* Yes, men and women everywhere have discovered this amazingly easy way to learn music at home. Now they are enjoying the thrilling satisfaction of playing the piano, violin, guitar, saxophone or other favorite instruments. Some of them are playing in orchestras and over the radio; others are teaching music, making money in spare or full time. And thousands are having the time of their lives playing for their own enjoyment and the entertainment of their friends.

LEARN TO PLAY BY NOTE
 Piano Guitar
 Violin Saxophone
 Organ Mandolin
 Tenor Banjo
 Hawaiian Guitar
 Piano Accordion
 Or Any Other Instrument

MANY NEVER SUSPECT CAUSE OF BACKACHES

As we get older, stress and strain, over-exertion, excessive smoking or exposure to cold sometimes slows down kidney function. This may lead many folks to complain of nagging backache, loss of pep and energy, headaches and dizziness. Getting up nights or frequent passages may result from minor bladder irritations due to cold, dampness or dietary indiscretions.

If your discomforts are due to these causes, don't wait, try Doan's Pills, a mild diuretic. Used successfully by millions for over 50 years. While these symptoms may often otherwise occur, it's amazing how many times Doan's give happy relief—help the 15 miles of kidney tubes and filters flush out waste. Get Doan's Pills today!

No tedious study and practice, no tiresome exercises. You learn to play *by playing*—start right in with the melody of a simple tune! It takes only a few minutes a day; the cost is trifling. Does it sound too good to be true? Mail the coupon and get the **FREE PROOF!**

FREE PRINT AND PICTURE SAMPLE

Fascinating illustrated booklet answers all your questions: free Print and Picture Sample shows how method works. If interested, just mail coupon. U. S. School of Music, 88 Brunswick Bldg., New York 10, N. Y. 52nd Successful Year.
 *Actual pupils' names on request. Pictures by professional models.

U. S. SCHOOL OF MUSIC

88 Brunswick Bldg., New York 10, N. Y.

I am interested in music study, particularly in the instrument indicated. Please send me your free illustrated booklet, "How to Learn Music at Home" and the Free Print and Picture Sample.

Name _____
 (PLEASE PRINT)
 Address _____
 Instrument _____ Have you _____
 Instrument? _____

LEARN TO WRITE

The Magazine Institute, a private school owned, operated, and staffed by successful writers and editors, offers an up-to-the-minute course in writing for magazines which makes it easy for beginners to get started in this rich field. You work in spare time at home. You may concentrate on either fiction or non-fiction. Send today for the **FREE CATALOG** describing the Magazine Institute method. **VETERANS: THIS COURSE APPROVED FOR VETERANS' TRAINING.**

The Magazine Institute, Inc.

Dept. 468-B, 50 Rockefeller Plaza,

Rockefeller Center, New York 20, N. Y.

Please send free catalog, without obligation, to:

Name _____
 Address _____

☐ Check here if eligible under G. I. Bill
 (Inquiries confidential. No salesman will call)

Only \$2.75 Postage Paid ... **GIVES YOUR CAR "Rocket" Performance!**

MORE POWER • SAVES GAS • NO PING • REDUCES CARBON

Install It Yourself On Any Car In 30 Minutes

JET VACUUM VAPOR INJECTOR MATIC

For less than the cost of a tank of gas it saves many times over, you get all the advantages of genuine Vapor Injection. Send check or money order today for complete kit with simple instructions and copy of Pittsburgh Testing Laboratory performance report. List make and year of car ... **30-DAY MONEY-BACK GUARANTEE!**

MESCO PRODUCTS, 1430 Union Commerce Bldg., Cleveland 14, Ohio

BLISS Electrical Training

Intensive 32 weeks' residence course in fundamentals of industrial electrical engineering, including radio and electronics. Extensive laboratory, shop work, drafting. Prepares for electrical technician and engineering aides in communications, power, manufacturing, business machines, sales, service. G.I. approved. 57th year. Enter November 6. Catalog. **7614 TAKOMA AVENUE, WASHINGTON 12, D. C.**

YOU CAN LEARN TO BE AN ARTIST



Start DRAWING At Home in Your SPARE TIME!

ENJOY THIS FASCINATING HOBBY TRAIN FOR A PROFITABLE CAREER—

Your future is in your own hands. Prepare yourself now in **COMMERCIAL ART, DESIGNING and CAR-TOONING**—all in ONE complete home study course. Trained artists are capable of earning \$65, \$80 and more a week. No previous art experience necessary—we teach you step-by-step for a fascinating hobby and a profitable career. For 36 years WSA graduates have been "making good"—WHY NOT YOU? Many pleasant art positions available in Television, Publishing, advertising, etc. **FREE BOOK, "Art for Pleasure & Profit"** fully describes course, service and commercial opportunities. **TWO ART OUT-FITS** included with training. Low cost—\$5 monthly.

(VETERANS! COURSE G.I. APPROVED)

FREE BOOK gives details!

WASHINGTON SCHOOL OF ART,
Studio 138W, 1115 15th St., N. W., Washington 5, D. C.
Send me free book, "Art for Pleasure and Profit." (Please print.)

NAME.....AGE.....
(Please Print)

Address.....

City.....Zone (.....) State.....

WHY DON'T YOU WRITE?

Writing short stories, articles on business, travel, shop crafts, sports, local and club activities, etc., will enable you to earn extra money. In your own home, on your own time, the New York Copy Desk Method teaches you how to write the way newspaper men learn—by writing. Our unique "Writing Aptitude Test" tells whether you possess the fundamental qualities essential to successful writing. You'll enjoy this test. Write for it, without cost or obligation.

Veterans: This course approved for Veterans' Training.
NEWSPAPER INSTITUTE OF AMERICA
Suite 5720-M, ONE PARK AVENUE, NEW YORK 16, N. Y.

ENGINEERING DEGREE IN 27 MONTHS

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO ENGINEERING (including Television). Hundreds of young men are earning engineering degrees in this recognized institution each year—continuous operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough, intense, practical program. Modern laboratory facilities including new physics lab. and modernized wind tunnel. Individualized instruction emphasized.

Approved for Veterans. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter September, December, March, June. Send coupon for free catalog and full information. Enroll now.

— SEND COUPON TODAY —

INDIANA TECHNICAL COLLEGE

680 E. Washington Boulevard
Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering degree in 27 months as checked.

☐ Aeronautical, ☐ Chemical, ☐ Civil,
☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name.....
Address.....

SPEED AND POWER Handbook

50 CHAPTER LIBRARY EDITION

Tens of thousands have been sold. Build Fast Stock Cars! California Roadsters! 160 MPH Rods! Covers Crosleys to Cadillacs—all makes. Authentic—direct from Californial

SAVE MANY DOLLARS

Build your own Dual Manifolds! Superchargers! Hot Cams! Water Injectors! Hi-Compression Heads! Mileage Devices! Get up to ten more miles per gallon! Get racing speed, lightning acceleration, dynamic power increases from any make passenger automobile! Get construction drawings! Tuning techniques! Speed tricks! Economy secrets! Ingenious formulas! Covers "Racing Frames"—"Reciprocating Masses"—"Jet Engines"—"Wheel Geometry"—"Dynamometers"—Dual Pipes, Gears, Fuels, Porting, Relieving, Lowering! Balancing—60 breathtaking chapters! Includes "CALIFORNIA AUTOMOBILE CUSTOMIZING"—Diagrams! Photographs in Color. Newest Ideas! Re-Styling all makes! Including 1950 Racing Equipment Catalogue, also, "Economy Manual" and "Injection Information" 300 illustrations. Five items, complete—\$1.98 post-paid. Racing Equipment Catalogue without book—50c.



SPEED SHOP METHODS

NEWHOUSE AUTOMOTIVE INDUSTRIES
5805 East Beverly Blvd., Dept. A4, Los Angeles 22, Calif.

DEPENDABLE CRAFT SUPPLIES

WRITE FOR CATALOG SINCE 1928

LEATHER CRAFT • PLASTICS • POTTERY
CRAFT • BLOCK PRINTING • BELT CRAFT •
TEXTILE COLORS • POWER TOOLS • WOOD
BURNING • INSTRUCTION BOOKS • ETC.

DWINNELL CRAFT SHOP
Dept. PS 508—Wheeling, W. Va.

WANT FAST PROMOTIONS?

Employers prefer high school graduates for managerial jobs. You can complete the C.T.I. guided study course in months. It equals resident work. Approved H.S. texts supplied. Credit for work elsewhere. College prep. Handsome diploma. Easy terms. Get set for success!—Write for valuable free booklet today!

COMPLETE HIGH SCHOOL AT HOME

COMMERCIAL TRADES INSTITUTE
1400 Greenleaf Dept. HI-8 Chicago 26

Learn ELECTRIC APPLIANCE REPAIR AND SERVICE

FREE! PLAN FOR YOUR SUCCESS

BIG PROFITS — BIG DEMAND for qualified men in field of Home Freezers, Washing Machines, Dishwashers, House wiring, Auto electricity, etc. Learn at home — start your own business. NO PREVIOUS EXPERIENCE NEEDED. Special tools & equipment furnished. Earn while learning. Write for YOUR FREE SUCCESS PLAN — ACT NOW!

PACIFIC TRAINING SCHOOL Dept. S-508
7217 South Broadway • Los Angeles 3, California

FREE BOOK

"YOU ARE UNDER ARREST!"

Help Bring Crooks to Justice Through Scientific **CRIME DETECTION!**

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you in your own home. Learn Finger Printing. Firearms Identification. Police Photography. Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I. A. S. students or graduates. We can prepare you for this fascinating work during spare time. Write today, stating age, for "Blue Book of Crime."

INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 136-C, Chicago 40, Ill.

LEARN AT HOME TO MOUNT BIRDS

Animals, Heads, Fishes, Pets; to TAN. Be a Taxidermist. Profit and FUN. Hunters, save your valuable **TROPHIES**. Mount ducks, squirrels, everything. Learn to TAN for leather and furs. Wonderful HOBBY Have a HOME MUSEUM. BIG PROFITS mounting for others. **INVESTIGATE NOW.**

FREE BOOK With 100 fine game pictures. NOW absolutely FREE. Write TODAY.

Send Postal TODAY for FREE BOOK. State AGE. **N.W. SCHOOL OF TAXIDERMY, Dept. 2608, Omaha, Neb.**




TUNE UP Your Car Engine with **HI-REV** NOW!

WORLD'S FASTEST PENETRATING OIL!

Marvel HI-REV is a GUM SOLVENT...its use will permit sluggish engines to regain their high standard of performance. It frees sticky valves and improves compression. Add one pint to gasoline tank for jet cleaning. One pint in radiator cleans rust from water jacket and radiator core.

HI-REV SUPREME AS TAR & ROAD OIL REMOVER

Excels any known product in freeing rusty nuts and bolts. Lightning fast on pipe joints and oil well fittings. Of great value in boat yards and around salt water...loosens rusty threaded connections easily. Will not produce rust or corrosion of any kind. Simple to apply in a stream from pint can by reversing cap spout. Made by the makers of famous Marvel Mystery

Oil. Emerol Manufacturing Co., Inc.,
242 W. 69th St., New York 23, N.Y.

**WRITE
NOW!**



EMEROL CHASSIS OIL

A waterproof Lubricant for all chassis work. Clings, penetrates and protects against rust, despite hard rains. Will not affect car finish in any way.



LEADING THE FIELD EVEN MORE THAN BEFORE

Mustang Lightweight Model "4"

... imitated but never equalled. Original American high performance lightweight. Exclusive 3-speed Burman GEAR BOX. High output flywheel generator-magneto. Big cross-country seat. Telescopic fork. 9.5 h.p., 4-cycle motor. 60 m.p.h. plus. 70 m.p.gal. plus. Write for free circular.

Only
\$346.30

fed. tax paid,
at factory.



MUSTANG, Dept. GP-50, 635 Colorado, Glendale 4, Calif.

WAR SURPLUS BARGAINS

**\$500,000.00 INVENTORY for
QUICK LIQUIDATION**

Surplus items—hundreds of them
for home, shop, factory, farm
and outdoor use. New items,
used items, reconditioned items—
all at tremendous savings—all
priced for quick sale.

PAGE AFTER PAGE OF VALUES
This big catalog shows page after page
of amazing money saving values. Write
for your copy today. Send 10c to cover
postage, mailing, etc. Write today!

SEND TODAY FOR YOUR COPY

10c

509 So. State St.
Dept. PS-8
CHICAGO 5, ILL.

Bar Bells

**BUY DIRECT
FROM
FACTORY**

\$8.95
up

Write for free booklet and price list

INDEPENDENT IRON WORKS

2416 East 23rd Street

Dept. C

Los Angeles 11, Calif.

NEON

G.I. APPROVED

SIGN SCHOOL

Learn Neon. Interesting, clean work, BIG PAY—\$1.50 to \$2.00 an
hour to start. 12½ week Job-Practice Course gives you training in
Glass Blowing, Neon Tube Bending, Color Gassing, other branches.
FREE FOLDER explains. Write today.

ACME NEON INSTITUTE (Write Nearest Office)

330 S. PAULINA ST., Dept. J-2,
CHICAGO 12, ILL.
G. I. Approved

418½ W. Olympic Blvd., Dept. J-2,
Los Angeles 15, Calif.
Write for G.I. Information

LEARN
IN 12½
WEEKS

AUGUST 1950 41

Learn A Trade NOW! PRACTICAL SHOP TRAINING!

In Our Chicago Shops

- | | |
|---|--|
| <input type="checkbox"/> AUTO MECHANICS | <input type="checkbox"/> WELDING—ARC and GAS |
| <input type="checkbox"/> DIESEL MECHANICS | <input type="checkbox"/> MACHINIST |
| <input type="checkbox"/> REFRIGERATION | <input type="checkbox"/> PIANO TUNING |
| <input type="checkbox"/> BODY-FENDER | |

Above Approved For G. I.'s and Civilians
One of America's Leading Practical Schools
7 Floors of Fully Equipped Shops
Over 50,000 Successful Graduates
Expert Individual Instruction
Learn by Doing—Low Living Expense
Established 1902—Day and Evening Classes

Also the following Home Study Courses

- | | | |
|----------------------------------|--|---------------------------------|
| <input type="checkbox"/> PLASTIC | <input type="checkbox"/> REFRIGERATION | <input type="checkbox"/> DIESEL |
|----------------------------------|--|---------------------------------|
- CALL IN PERSON OR MAIL THIS AD TO—

GREER SHOP TRAINING

(Desk 12) 460 South State St., Chicago 5, Ill.

Please send without obligation free information regarding trade checked above. (Specify whether you are a Veteran ☐ or Civilian ☐)

Name.....Age.....
Address.....
City.....State.....

MEN A Blue Print For YOUR SUCCESS!

Here is your opportunity for Success. An amazing new finishing system that will start you in your own profitable business. No experience necessary—up to \$10 an hour easy. Spare or full time in your own home or garage. Start small—grow big fast. We will guide you every step of the way. This is BIG—don't miss your chance. Send name now for FREE SAMPLE of my complete easy profit plan for your success.

COAST INDUSTRIES

Dept. 18 1004 S. Los Angeles St., Los Angeles 15, Calif.



ENJOY SECURITY! RETIREMENT! 26 days annual leave GOVT. JOBS start as high as \$3351 A YEAR

Thousands of jobs for men and women now open! Prepare for coming examinations in your community as thousands of others have in the past. Although not government controlled, this can be the first step for you in obtaining the kind of position you've always wanted.

FREE! List of Civil Service Jobs, and complete information on how you can qualify, sent on request. The job best suited for you may be open now, so don't delay. Mail coupon today!

NATIONAL COACHING SERVICE INSTITUTE, INC.

Dept. P 412 5th St., N.W., Washington, D.C.

Rush to me, entirely free of charge, full information and list of U. S. Government Jobs.

Name.....
Street Address.....
City.....County.....State.....
Age.....Occupation.....Race.....



200
ILLUSTRATIONS

SPEED & MILEAGE MANUAL

Easily Get Super Speed, Acceleration, Mileage—Top Racing Performance From Any Automobile!

Famous New Book shows simplified Soup-up Methods—Speed Tuning—Economy Secrets—Customizing Plans—Latest Track Proven Methods for all cars! Tells how to build your own SPEED EQUIPMENT! FAST SPORT CARS! "CALIFORNIA HOT RODS"! 200 H.P. ROAD & TRACK CONVERSIONS! Complete Instructions on building inexpensive Superchargers! Dual Manifolds! "Water Injectors"! High Compression Heads! Twin Mufflers! Economizers! All about—Fast Engines, Gas Saving, Restyling, "Cam Secrets," Multiple Carburetion, Fuels, Porting, Ratios, Frames, "Offys"! BRAND NEW METHODS, Plans, Formulas, "Racing Tricks"—"STOCK CAR SPEED SECRETS"! Reveals 100 ways to save gas! Shows latest "HOLLYWOOD CUSTOM STYLING"! Streamlining! Sport Changes! Lowering! Speed Conversions! Including—California Roadster Plans! Racer Diagrams! Working Drawings! Performance Charts! Graphs! Beautiful Photographs! Etc.!

Large manual (plus) "California Equipment Catalog" and Hot Rod Handbook.

ALMQUIST AUTOMOTIVE ENGINEERING
Milford 22Z, Pa.



WANT \$10,000?

Earn the govern- Super Sensitive P.R.I. ment bonus. Locate Uranium with a **GEIGER COUNTER**

Find gold, silver, and other valuable ores with a P.R.I. Treasure Locator. World's finest instruments. FREE catalog. Write today.

PRECISION RADIATION INSTRUMENTS, Inc.
5478 PS Wilshire Blvd., Los Angeles 36, Cal.

Dealer Inquiries
Invited



SHOE REPAIR OFFERS BIG INCOME

LEARN IN 12 WEEKS TIME

You can own your own shop or earn big income as skilled shoe repairman. Growing demand everywhere at top wages for men who know how. We teach you quickly by actually working on shoes and modern machines. School open to all from 18 to 60 years of age. Free Big 20 Page Book explains everything. Send for your copy today. Established 1927.

MODERN SHOE REBUILDING SCHOOL

Chicago and Los Angeles only Approved for Vets. Dept. P5-80
2937 Belmont Ave., Chicago, Ill. 361 12th St., Oakland, Calif.
806 So. Figueroa St., Los Angeles 14, Calif.



TRAILER PARTS



BULL DOG Hitches, Parking Jacks and Axles for all types of trailers!

Write for FREE Catalog
Hammer Blow Tool Company
Wausau 14, Wisconsin

PROFITS MAKE YOUR OWN RUBBER MOLDS

WRITE TODAY FOR
NEW FREE CATALOG

Learn to cast thousands of perfect figurines, plaques, book ends, ash trays, etc. Start TODAY!

NO EXPERIENCE
GREAT PROFITS

Little capital needed. Full instructions. X.L. Rubber. Pts. \$2.00. Quarts \$3.50. Gallons \$8.95. Models and enough rubber for 3 molds—\$1.30 postpaid.

PLASTIC ARTS STUDIO

3403 S. MADISON ST.
DEPT. 3, MUNCIE, INDIANA

CARBURETOR TOO RICH MAKES MOTORIST TOO POOR



Car owners who are wasting money and not getting proper gas mileage due to over-rich mixtures will be pleased to learn how to save gasoline by VACU-MATING over-rich mixtures. VACU-MATIC fits all cars, trucks and tractors. It is automatic and operates on the supercharge principle. Easily installed in a few minutes.

SALESMEN WANTED! Big Profits! Send name, address on penny postcard for free particulars and how to get yours for introducing.

VACU - MATIC CO., 7617 - 1638 W. State St., WAUWATOSA, WIS.

now YOU CAN DRILL YOUR OWN WELLS!

Sturdily Made—Hundreds of satisfied customers. Purchased and used by U. S. Dept. of Agriculture, U. S. Dept. of Forestry, U. S. Navy and many foreign countries. Fully Guaranteed.

NEW LOWER PRICE \$345.00.

Less Motor, F.O.B. Factory. Price includes drill, bailer and 100' cable. 200 ft. of additional length available at extra cost.

Drill your own wells for that needed water—as many as you need—outside—in the cellar—in the barn. The new improved **CONSOL Driller—1950 Model**—is equipped with a special replaceable Drill Head. It will drill through many feet of solid rock without resharpening. Simple to operate, easy to set up. Do the work yourself at small cost.



A **HEAVY DUTY MODEL** for 6" casings also available at \$1295., F.O.B. Factory, equipped with Gasoline Engine.

Write for free information and booklet, Dept. PS.

CONSOLIDATED INDUSTRIES
West Cheshire, Conn.

LEARN AERONAUTICAL ENGINEERING

Aircraft and Engine Mechanics (A&E)

Train at the Flying Wing school—New classes starting soon. Write for illustrated catalog.

Northrop Aeronautical Institute

APPROVED FOR VETERANS DIVISION OF NORTHROP AIRCRAFT, INC.
1525 E. Broadway, Hawthorne, Los Angeles County, California

Learn PHOTOGRAPHY

There's big money in PHOTOGRAPHY—and an action-packed career for you. Our HOME STUDY COURSE is your spare-time SHORT CUT TO SUCCESS! Or, if you wish—PERSONAL ATTENDANCE TRAINING at our famous New York School is available with subsistence under the G. I. Bill. Our 40th year. Write immediately!

NEW YORK INSTITUTE OF PHOTOGRAPHY

Dept. "S," 10 West 33 Street, New York 1, N. Y.

MAKE MONEY IN LANDSCAPING

Thorough training by Internationally known Landscape Architect to start your own business, improve your home or advance in this well paid field. Many Opportunities. Approved for Veterans. Send for FREE BOOK.

NATIONAL LANDSCAPE INSTITUTE

310 So. Robertson Dept. PS-8 Los Angeles 48, Calif.

FALSE TEETH

**That Loosen
Need Not Embarrass**

Many wearers of false teeth have suffered real embarrassment because their plate dropped, slipped or wobbled at just the wrong time. Do not live in fear of this happening to you. Just sprinkle a little **FAS-TEETH**, the alkaline (non-acid) powder, on your plates. Holds false teeth more firmly, so they feel more comfortable. Does not sour. Checks "plate odor" (denture breath). Get **FAS-TEETH** at any drug store.



\$250,000

FOR THIS!

2100 Other Inventions Badly Needed— Big Cash Waiting for Your Little Ideas

IT'S OFTEN the simplest ideas that make the most money! The Kiddie Kar brought its inventor a cool MILLION dollars. A 70-year-old grandmother made \$350,000 on an improved overall buckle. The paper clip, the hair-pin, the rubber pencil tip all made fortunes for the people who "dreamed" them up.

You can cash in, too—if you concentrate on the inventions that are really needed!

The EASY Way to Get Started

Don't waste time and brain-work on something nobody wants! Find out WHAT to invent. A valuable book by Raymond F. Yates, noted science editor and inventor, lists and describes over 2100 PRACTICAL, money-making ideas that are crying aloud to be invented!

These 2100 ideas are the things most needed and surest to make money. They are listed under 34 different headings for quick reference: Electrical, Radio, Automotive, Agricultural, Building, Household, Clothing, Toys, Timesavers, etc.

This book ALSO tells how to think inventively; how to PROTECT your ideas; how to develop an invention STEP-BY-STEP, etc.

FREE EXAMINATION OFFER SEND NO MONEY

Wouldn't you like a slice of the \$280,000,000 that American inventors get each year in royalties? Get started now! You don't risk a penny. Simply mail coupon below WITHOUT MONEY—and get "2100 Needed Inventions," by Raymond F. Yates, for 5 days FREE TRIAL. If, even in that short time, you are not convinced that this book can help you make money—just return it and owe nothing. Otherwise, send only \$2.50 plus few cents postage, as payment in full.

Any one of the 2100 ideas in this book can bring somebody a fortune. Maybe it can be YOU! Mail coupon at once! Wilfred Funk, Inc., Dept. T598, 227 East 44th Street, New York 17, N. Y.



FREE 5-DAY EXAMINATION

WILFRED FUNK, Inc.
Publishers, Dept. T598,
227 East 44 Street, New York 17, N. Y.

Please send me 2100 NEEDED INVENTIONS, for FREE EXAMINATION. If I keep the book I will send you \$2.50 plus few cents postage. Otherwise I will return it within 5 days, without further obligation.

Name.....

Address.....

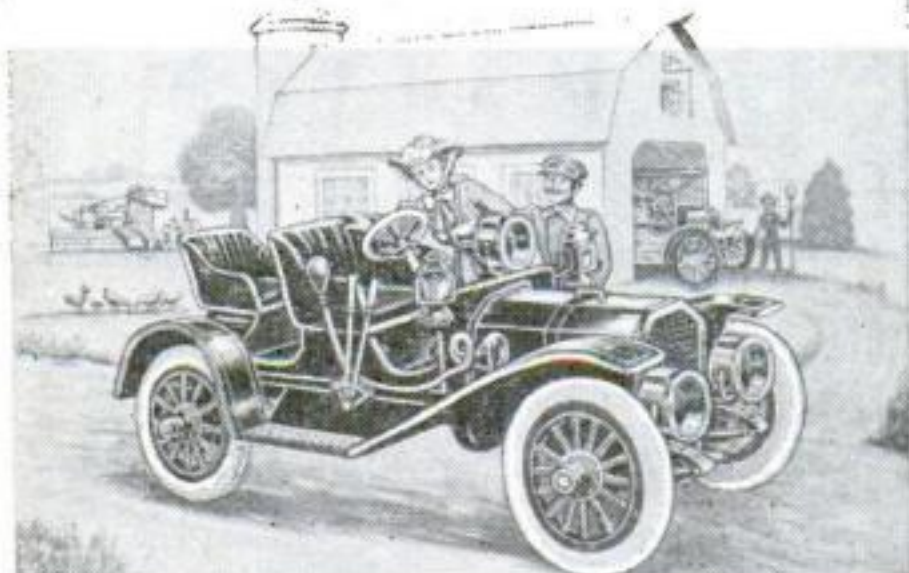
City..... Zone No.

(If any)..... State.....

☐ Check here if enclosing \$2.50 WITH this coupon, and we will pay all postage charges. Same 5-day return privilege, for full refund, applies. (Canadian Orders—25c extra for carrying charges. Only U.S. currency accepted.)

International Harvester \$2⁹⁵

1910 PASSENGER CAR MODEL



It may come as a surprise to you, but International Harvester did make a passenger car in 1910. They ceased production after two years—and that's what makes this antique auto such a rarity! Our scale model is from James Melton's Harvester Auto—one of his most prized museum cars! Pre-fabricated parts, easy to assemble. Length 8 1/2". Only \$2.95. Also 12 other famous antique auto sets:

1911 Maxwell.....\$2.50	1910 Model "T".....\$2.50
1903 Model "A".....\$2.50	Ford.....\$2.50
1904 Olds.....\$1.95	1903 Rambler.....\$2.50
1909 Stanley.....\$2.95	1909 Model "T".....\$2.95
1911 Buick.....\$2.50	1900 Packard.....\$2.50
1914 Stutz.....\$3.95	1903 Cadillac.....\$2.50
Bearcat.....\$3.95	1911 Mercer.....\$3.95
	Raceabout.....\$3.95

FREE!
Write for
Your Copy of
Our 1-Color
FOLDER

SEE them at your hobby, toy, or department store, or write to us
Add 25c for postage and handling; no C. O. D.'s, please.

Hudson Miniatures' "OLD TIMERS"
SCRANTON HOBBY CENTER, Dept. 28, Scranton 10, Pa.

Learn TELEVISION RADIO—ELECTRONICS

Prepare in spare hours for good pay in Television, Radio and Electronics. Train at home with Frank L. Sprayberry, America's outstanding Radio instructor. Big Kits of equipment furnished. Build testers, sets, etc. **VETERANS:** Approved for Training under GI Bill. Rush name and address for details and 2 BIG RADIO BOOKS—**ALL FREE!** No salesman will call. Write today!

Sprayberry Academy of Radio, Dept. 55-M
111 N. Canal Chicago 6, Illinois

New Advertising Machine

Prints & Illustrates 1¢ Post Cards

FREE Learn how thousands of business men, in every line, are boosting sales in spite of conditions—with 1¢ messages—printed and illustrated in a few minutes on gov't post cards—with amazing new patented **CARDMASTER**. Your "today's" ideas, read by your prospects next morning. Not a toy, but a sturdy advertising machine, built to last for years. Low price, sold direct. Guaranteed for five years. Send name today.

SEND NAME We'll send **FREE** illustrated book of money-making IDEAS for your business and complete, unique advertising plans. **RUSH YOUR NAME TODAY.**

CARDMASTER COMPANY
1920 SUNNYSIDE, Dept. 168, CHICAGO 40, ILL.



Ball-Bearing SPEED WHEELS



JUVENILE WHEELS (No bearing, solid tires)

4".....40c	6".....65c
5".....45c	7".....75c

(Semi-pneumatic tire, ball bearing)

8 x 1.25.....1.85	10 x 1.25.....2.20
8 x 1.75.....1.95	10 x 1.75.....2.30
8 x 2.....2.20	10 x 2.00.....2.65
12 x 1.75.....3.45	

Dealers, Jobbers, and Manufacturers! Our new prices will interest you.

No c.o.d. orders. Prices F.O.B. our plant.

JIM BROWN TOY COMPANY
1093 HOME AVE. AKRON 10, OHIO

Trained Men Get the Better Jobs
PRACTICAL SHOP TRAINING
in **AUTOMOTIVE MECHANICS**
BODY and FENDER REBUILDING

If interested write or wire

ATLANTA MOTIVE TRADES INSTITUTE
Dept. C 254 IVY St., N.E. Atlanta, Georgia
Member of the Southern Association of Private Trade Schools
Veterans ask about G I Training



FAMOUS DAN LURIE BARBELLS

\$7.98 SATISFACTION GUARANTEED
OR YOUR MONEY BACK!

Proven \$15 bodybuilding course **FREE** with every purchase. **YOUR MONEY BACK** if not delighted with results after 6 weeks.

Send for **FREE CATALOG**
DAN LURIE BARBELL CO.
1701 S-B Pitkin Avenue, Dept. 170-G, Brooklyn 12, N. Y.

LEARN UPHOLSTERING

A money-making business or side-line. Practical home training teaches you quickly, easily. Low cost, easy terms. You get professional upholsterer's tools. Write or send penny postcard today for **FREE ILLUSTRATED BOOKLET**.

WEST COAST UNIVERSITY Extension Dept. PS 80
1601 S. Western Ave. Los Angeles 6, Calif.



Find HIDDEN TREASURES

GEIGER COUNTERS for Uranium Detection (see at left). **TREASURE DETECTORS** for gold, silver, etc. Lightweight, ultra sensitive. None finer at **ANY PRICE**. **INFORMATION FREE.**

Detection Co. Dept. 8-A
5631 Cahuenga, No. Hollywood, Calif.

PARTS FOR MILITARY TRUCKS

At Big Savings. New **FREE Catalog**
For Jeep, Dodge, Chevrolet, G.M.C., Studebaker

Brand New JEEP TOP and CURTAINS
Fits all Military Jeeps. Also adaptable to Civilian Jeeps.....**\$49.50**

Brand New JEEP HYDRAULIC JACKS Walker, 3 ton, Complete, limited supply, ea. **\$9.95**

UNITED AUTO PARTS CO., INC.
1901 TROOST-GR.1800-KANSAS CITY, MO.



SAVE with SAFETY the THORESEN way!

THORESEN'S IRONCLAD GUARANTEE PROTECTS YOU



SHOCK RESIST 6.97
SWISS no extras

Military style! Drop it! Bang it! Guaranteed 2 years against all breakages because of exclusive Swiss Insulator invention. Luminous hands and numerals. Unbreakable crystal. Sweep second. Heavily chromed. Thin, smart! Not jeweled but guaranteed accurate. Long, satisfying service. No extras for tax—full price 6.97

Special! 17 JEWEL DELUXE MODEL
5 year Guarantee (Featured in Esquire). Wonderful precision. Shock and Water resistant too. An outstanding value at our low, tax-free price of 17.65

Thoresen's 17 Jewel **29.88**
FULL AUTOMATIC no extras

De-Luxe model—fully automatic! Set it, then forget it! It winds itself as you wear it. Patented Incabloc. Anti-Magnetic. Sweep second. Luminous dial. WATER & SHOCK resistant. All stainless steel back case. 17 jewels. Near-miracle accuracy. Thin! Handsome! 5 YEAR GUARANTEE. Formerly \$75.00. Thoresen's direct-to-you-price, only —29.88—no extras for tax. Rush! Supply limited!



Genuine ZIRCONS!
MEN'S INITIAL RING

Something SPECIAL for men! Your initial in raised Gold Color Effect, set in a Vermilion-Red stone. Flanked by 2 GENUINE ZIRCONS. Imported from far-away Siam. Now yours for only \$4.97, yet it looks like \$650.00 or more! Remember these are NOT imitations but 100% GENUINE ZIRCONS that sparkle with a 1000 rays of light! Color and cut like precious diamonds. Real, honest value!

Any item sent on APPROVAL!

Sent only sale price shown—no extras—for quick, insured delivery, or order C.O.D. plus postage. Complete satisfaction GUARANTEED or money back pronto!

FREE
10 DAY TRIAL

Price promptly refunded if not thrilled within 10 days after receiving. Not a penny's charge for "handling," postage, parts or repairs on watches! THORESEN makes lifetime friends! References: Bank of Athens, New York, or any bank in America. Send check or money order. C.O.D.'s accepted plus postage.

THREE SYNCHRO DIAL
Precision Made
Swiss Chronograph

Outstanding value sleek handsome 3 dial chronograph. Amazing accuracy. Ideal for hobbyists, mechanics, scientists, doctors, sportsmen, students, aviators, etc. 20 SUPER FEATURES —3 Synchro Dials. 30 minute register. 1/5 second calibration, rugged shock-resistant case, sweep second, luminous dial. Built-in tachometer and tele-meter measures speed and distance of planes, autos, horses, photos, etc. without stopping movement. 3 year guarantee. Formerly \$39.95. Now at slashed price of \$14.95. No extras.



14.95
no extras

THORESEN Direct Sales

Dept. 7H-200

131 West 33rd St., NEW YORK 1, N. Y.

DON'T MISS IT! ONLY 10¢

BIG CATALOG
WAR SURPLUS
OPTICAL BARGAINS

LENSES! PRISMS! INSTRUMENTS!

Build Your Own
RIFLESCOPE, BINOCULARS, TELESCOPE, ETC.

We Furnish Optics and Instructions

- LENSES, PRISMS & RETICLES
- EYEPIECES and OBJECTIVES

Send \$1.00 for Stock #2-N
10-Piece Lens Kit and Big
Instruction Booklet.

CHECK OUR BARGAINS . . . MAIL 10c FOR CATALOG N
EDMUND SALVAGE CO., BARRINGTON, N. J.

MAKE BIG
MONEY

PLASTICS

LEARN
AT HOME

LEARN HOW
TO MAKE
fast selling
PLASTIC
NOVELTIES
FURNITURE
JEWELRY
SIGNS
TOYS
LAMPS

There are RICH OPPORTUNITIES for MEN and WOMEN with "know-how" in Plastics. Interstate's amazing new Plastics course tells and shows how to make hundreds of fast selling items out of Plastics. Gives complete training in fabrication, casting, lamination, molding, etc., in simple, easy, step-by-step language and pictures.

START A PLASTICS BUSINESS OF YOUR OWN. No other industry holds such promise for the future. You can make big money manufacturing novelties, toys, signs, etc., in your own home in spare or full time. Don't wait! Learn NOW how Interstate's Plastics Training qualifies you for success in the plastics field.

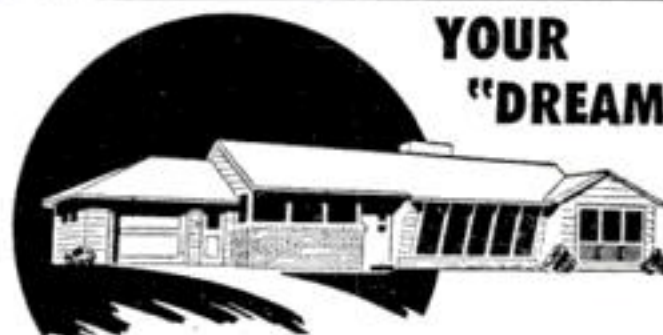
Write for FREE Information Today!

INTERSTATE TRAINING SERVICE

School of Plastics
PORTLAND 13, OREGON

Dept. 2-H

YOUR
"DREAMHOUSE"



ALREADY PLANNED FOR YOU

You will find it in the brand new HOME PLAN BOOK of the Home Building Plan Service.

This new book contains plans never before published. You will find the house of your dreams among the many plans, which include starter homes, small homes, and large homes, in a wide variety of contemporary and traditional designs for both frame construction and block masonry. \$1.00 for each book. No C.O.D.'s please.

Complete working blueprints are available for any home illustrated in the Home Building Service Plan books.

HOME BUILDING PLAN SERVICE
2454-P NE Sandy Portland 12, Oregon

Watchmakers MAKE MONEY!

Large earnings, professional dignity and a steady, secure future can be yours as a Master Watchmaker! You can choose a fine job or go into business for yourself.

The nationally-known Sweazey System teaches you in the shortest allowable time . . . at home or in our modern, fully-accredited resident school.

SEND FOR FREE PAMPHLET and Information NOW!
Since 1908, Chicago School of Watchmaking graduates have been in constant demand. Big opportunities for trained workers. Resident courses in watch repairing, gem setting, and engraving. Home Study Course in Master Watchmaking.

CHICAGO SCHOOL OF WATCHMAKING, 1608 Milwaukee Avenue
Chicago 47, Illinois, Dept. 480

Please send copy of "Civilization's Debt to the Watchmaker" and information on courses without cost or obligation.

I am interested in

- ☐ Resident School
- ☐ Home Study

- ☐ Veteran
- ☐ Non-Veteran

NAME.....

ADDRESS.....

CITY.....ZONE.....STATE.....

AUGUST 1950 45



\$1.00 BRINGS YOU BOTH CANS!

Yes sir—give your car the glow that rests your elbow! Use LACQUER CLEANER, the amazing pre-wax cleaner, and LACQUERWAX, the famous car finish protector. It's 5 times faster and easier to apply than ordinary paste waxes. One treatment lasts 4 to 6 months.

LACQUERWAX contains no lacquer, but this hard, liquid wax is CLIMATEPROOF! Its brilliant luster shines right thru hot sun and driving rain. You can't wash it off—it won't spot! It brings out and preserves the full beauty of your car's finish. Use the LACQUER CLEANER first to remove dead paste wax and dirt, then LACQUERWAX for the beauty treatment. BOTH 10 oz. cans—ample to do your complete car—for ONLY \$1. Mail Coupon NOW!

LACQUERWAX CO. Dept. PS-8
31 SPRUCE ST., HARTFORD 3, CONN.

Gentlemen: My dollar bill, check or money order is enclosed for the 2 ten oz. cans—LACQUERWAX & CLEANER.

Name

Address

City..... Zone..... State.....

LACQUERWAX

MANUFACTURE BUILDING BLOCKS

Easy to start your own profitable business. General high speed, low cost Concrete Vibrator Block Machine produces 1000 blocks in 8-hour day. All sizes and shapes. Complete details FREE. Mail \$1 for wonderful book, "How to Build Your Own Concrete Block Home."

GENERAL ENGINES CO.
307 HUNTER ST., S-11, GLOUCESTER, N. J.

Only \$1.99



SANDEE

Mufflers—All Ford, Chev., Ply....\$4.45

All Buick, Pont., Olds., Chrys., Dodge, Hudson, K.F., Pack., etc....\$5.45

V-8 and Merc. Duals (32-50 incl.) \$15.95

DEALERS WANTED



SPORTONE
(Reg. U. S. Pat. Off.)
MUFFLERS

DURABILITY

Olds V-8 Duals....\$35

A SANDEE Sportone will outlast two ordinary mufflers and give More Power! More Speed! More Mileage!—plus a tone quality unsurpassed.

Please ship (item):..... Price.....

Car and Year..... Name.....

Address.....

SANDEE MUFFLER CO. 5643 Corryne Pl. Culver City, Calif.

Beautiful SANDEE Fender Skirts \$9.95

Pat. Pend.



Not a toy! A perfectly balanced small arm for sport and small game! Special introductory offer: "Powr-Pak" Pistol Sling, 50 "Tru-Flite" 23 gr. pellets, extra sling, 10 "Red Dot" targets, postpaid, \$2.25 cash, check or money order. No COD's! Money-back guarantee. Order yours today from Baron Industries, Box 3578M, Cleveland 18, Ohio. Order extra supply 23 gr. "Tru-Flite" Pistol Sling pellets with your Powr-Pak, 250 for \$1.00.

"PLASTICS"

FABRICATING MANUAL AND CATALOGUE

Work in a fascinating and profitable hobby. Just out—our latest fabricating manual. Tells you how to work with Plastics. Our new Catalogue provides all needed materials: Plexiglas—Lucite—Tenite—Catalin—Acetate—all in sheets, rods, and tubes. Complete line of cements, dyes, accessories and supplies. Send 20c today for latest Catalogue and Handbook.

HOUSE OF PLASTICS

8648 Linwood Avenue Dept. MO-8 Detroit 6, Michigan

Be a DETECTIVE

A CHALLENGE FROM WASHINGTON, D. C. Help Stop Crime! Train at home. Earn big money. Amazing training course from the NATION'S CAPITOL (center of law enforcement) by former U. S. GOVT. AGENT and NAVAL INTELLIGENCE Officer exposes actual methods used by Criminals. Write for FREE BOOK. State age.



INTERNATIONAL DETECTIVE TRAINING SCHOOL
1701 Monroe St., N.E. Dept. 218 Washington 18, D. C.

make your own Gems 29.50 F.O.B.

All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only \$29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

B&I MANUFACTURING CO.
Dept. M Burlington, Wis.

Rupture Troubles Ended

Advanced method has healed thousands. No leg straps, no elastic, no plasters. No pressure on hips or spine. Flexo-pad. Entirely different. Endorsed by doctors, mechanics, clerks. Very light. INEXPENSIVE. GUARANTEED. Write for information and trial.

SMITH MANUFACTURING COMPANY
EST'D 1893 Dept. PS, Preston, Ont. Can.

FOR BIG MEN ONLY!



SIZES 10 to 16 WIDTHS AAA to EEE

We SPECIALIZE in large sizes only—sizes 10 to 16; widths AAA to EEE. Loafers, Wing Tips, Moccasins, Dress Oxfords, High and Low Work Shoes, House Slippers, Rubbers, Overshoes, Sox. Extra quality at popular prices. Satisfaction guaranteed. Sold by mail only. Write for FREE Catalog.

KING-SIZE, Inc., 980, Brockton, Mass.

SEND FOR FREE CATALOG

Make Garden Masonry for Spare-Time Profits

Millions of homes can use these Ornamental products — urns, vases, flower boxes, bird baths, lawn seats, flagstones, etc. Easily made of sand and cement. Permanently glazed in a range of smart colors. Distinctive — attractive — quick selling.

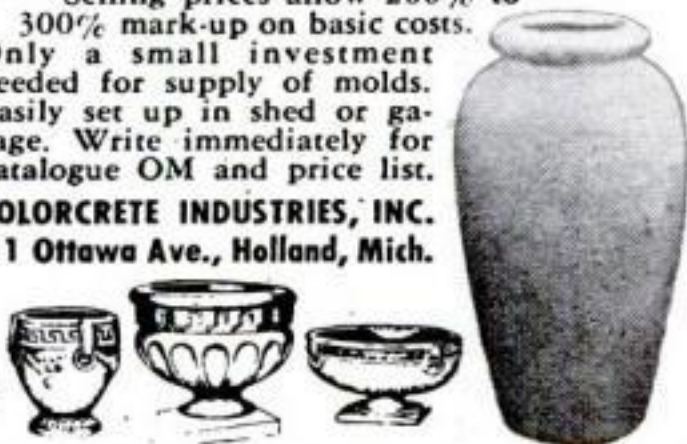
Eye-Appeal Makes for Cash- and-Carry Sales



Selling prices allow 200% to 300% mark-up on basic costs.

Only a small investment needed for supply of molds. Easily set up in shed or garage. Write immediately for catalogue OM and price list.

COLORCRETE INDUSTRIES, INC.
711 Ottawa Ave., Holland, Mich.



OWN a Business

Clean and Mothproof rugs and upholstery "in the home." Patented equipment. No shop needed. Duraclean dealer's gross profits up to \$20 a day on EACH serviceman. These Nationally Advertised services create repeat customers. Easy to learn. Quickly established. Easy terms. Send today for Free Booklet—Full details.

Duraclean Co., 0-188 Duraclean Bldg., Deerfield, Ill.

EYE- GLASSES BY MAIL

16 Days Trial



Write Today for Free Catalog. Send no Money

ADVANCE SPECTACLE COMPANY

537 South Dearborn Street, Dept. SP-8, Chicago, Illinois

EASY EXTRA MONEY \$ SELL CHRISTMAS CARDS

to friends, clubs, neighbors and fellow workers. It's Easy! Country's outstanding line. Make up to 50% commission. 21 card assortment \$1.00, sells on sight. Name imprinted cards up to 50 for \$1.00. 6 FREE SAMPLES of personal cards, stationery, napkins. Box samples on approval.

LIBERTY BELL STUDIOS—Dept. A-4, 1013 Filbert St., Phila. 7, Pa.

JOBBER'S PLASTIC-SHINE

DISTRIBUTORS:

LIQUID PLASTIC CAR POLISH IN
GROWING DEMAND EVERYWHERE



- SALES GALORE
- RE-ORDERS POURING IN
- HUGE PROFITS
- NATIONALLY ADVERTISED
- EXCLUSIVE TERRITORIES OPEN

SEND FOR DETAILS!

PLASTIC-SHINE LABS., INC.

7516 N. W. 7th Ave., MIAMI, FLA.

"I Have Earned an Average of

\$1520 AN HOUR"

with Science's New Midget
Miracle, the PRESTO
Fire Extinguisher



WILLIAM F. WYDALLIS

Says William F. Wydallis, Ohio.
Many Others "Cleaning Up"
—So Can YOU!

OVER 11,000 people died in fires last year. An eager public has been waiting for a practical new kind of fire extinguisher. Now it's here! Tiny "Presto" is about the size of a flashlight. Does the job of bulky extinguishers that cost 4 times as much and are 8 times as heavy. Ends fires fast as 2 seconds. Fits in palm of hand. Never corrodes. *Guaranteed for 20 years!* Sells for only \$3.98!

You can make good money showing this new discovery to owners of homes, cars, boats, farms, filling stations, buses, trucks, service stations, factories, offices in your locality. Stanley Hyman reports making over \$1000 a month. H. J. Kerr, \$20 a day. R. E. Meade, \$75 the very first day.



Science's
New Midget
Miracle—
"PRESTO"

What's the secret of "Presto's" amazing power? It's a new wonder chemical developed during the war, found to be 1.5 to 6 times as effective as chemical contents of other extinguishers on an equal weight basis. Makes possible, for the first time, an extinguisher that is small, light, and amazingly effective.

Help supply the demand for this important new discovery. Write for FREE Sales Kit. No obligation; no capital required. But don't put it off. Every day you hesitate may cost you \$10, \$15, or even \$50 you could be making. Mail coupon NOW for everything you need. **MERLITE INDUSTRIES, Inc., Dept. 118, 201 East 16th Street, New York 3, N. Y.**

**MERLITE INDUSTRIES, Inc., Dept. 118,
201 East 16th St., New York 3, N. Y.**

Please send me illustrated sales literature, liberal profit plan, order blanks—everything I need to start making good money introducing Presto in my locality.

☐ Check Here if you wish to order a regular Presto to be used as a demonstrator (\$2.50). Pays for itself many times in increased sales. Returnable for FREE refills. Send no money—we'll mail C.O.D. (Or enclose \$2.50 and WE will pay postage.)

Name.....
(Please print plainly)

Address.....

City..... Zone No. (if any)..... State.....

Yes, More Brilliant Than a Diamond!



Amazing New Discovery

Write today for the full story of the latest miracle of science, discovered in the laboratories of one of the world's largest corporations. The story of the beautiful Kenya Gem that so closely resembles a diamond that only an expert can tell the difference.

More Fire! More Brilliance!

Yes, this marvelous gem has more brilliance, more fire, and a more dazzling display of color than the finest diamond of equal size. And yet you can now own an unmounted Kenya Gem for only \$24 (1 carat) to \$96 (4 carats); also men's or ladies' beautiful gold rings for as little as \$45. If you wish, you can buy on EASY PAYMENT TERMS.

The Cinderella of Modern Science

Kenya Gems are the sensational discovery you read about in Sat. Eve. Post, Jewelers' magazine and N. Y. Times, "the only thing on earth more brilliant than a diamond." It is a true gem, crystallized by science instead of nature and perfectly cut by expert cutters.

Send Coupon or Write today for FREE illustrated literature.

KENYA GEM CORPORATION DEPT. 308

Copyright 1950
Kenya Gem Corp.

Philadelphia 44, Pa.

Mail This FREE COUPON Today!

Kenya Gem Corporation Dept. 308 Philadelphia 44, Pa.

Please send me, without obligation, the FREE illustrated descriptive literature telling all about Kenya Gems, the new discovery more brilliant than a diamond.

Name.....

Address.....

City.....State.....

WORK SHIRTS

10-DAY TRIAL
Orders Filled Promptly

69c
3 for 1.79



AMAZING VALUES!

SAVE money! These are surplus stock from a big supply firm. Sturdy, serviceable work shirts, though used, have been washed, sterilized and reconditioned. Every shirt of long-wearing wash materials. Blue, tan, white. Strongly sewn; reinforced stitching at points of strain. Money back guarantee!

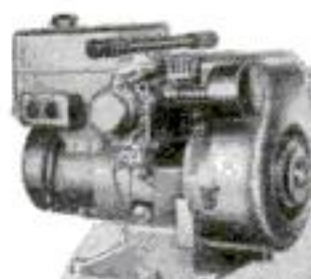
WORK PANTS TO MATCH.....99c
Blue, Tan, White. Send waist measure and leg length.

SEND NO MONEY!

Give name, address, city or town, size and color choice, (also state 2nd color choice). Pay postman, plus postage. Or send cash and we ship prepaid. Keep 10 days. If not satisfied, return for refund! Order Now!

YOUNG DISTRIBUTING CO.

Dept. M, 2605 Elmhurst Detroit 6, Mich.



ONAN Portable ELECTRIC PLANTS

FOR CABINS, TRAILERS, CONTRACTORS, BOATS

Light weight, compact, air-cooled engine-driven. Furnish regular city-type A.C. electricity for lights, appliances, radios, etc. Can be carried by hand. Fit trunk of car. Plug-in receptacles on plant. Larger models for farms, homes, businesses beyond highlines. Catalog shows over hundred models. 350 to 75,000 watts.

Gasoline or Diesel Powered

Prices begin at \$169.50

WRITE FOR CATALOG

D. W. ONAN & SONS INC.

2810 Royalston Ave., Minneapolis 5, Minn.

HOW to Make Your Own RUBBER MOLDS

Here's a quicker, easier way to make exact reproductions of an object in any quantity. No heat curing required; no shrinking of materials. Objects of clay, plaster, wood, metal, glass or stone-like ashtrays, bookends, medals, souvenirs, plaques, sculpture can be copied exactly right at home! Perfect for reproducing Dresden figurines. No previous experience needed. No special tools required. Our new Brochure 288 gives exact, step-by-step instructions anyone can follow. Send 10c for it to SCULPTURE HOUSE, 304 West 42 Street, New York 18, N. Y.



FORD - MERCURY OWNERS

Quicker Acceleration! Higher Top Speeds! More Gas Mileage!

WOHLFEIL'S NEW, SPECIAL THIN HEAD GASKETS increase compression in your V-8 motor from 6.75 to 7.125 to 1 ratio. Easily installed by anyone. Money back guarantee. Order Today. State year of car. Wohlfel parts are standard equipment on America's foremost racing cars. Send 10c for illustrated folder describing other speed and racing equipment.

\$3.95 per pair
postpaid

WOHLFEIL DEE ENGINEERING
2274 S. TELEGRAPH RD. PONTIAC, MICHIGAN

ROLLER KING patented 'Wonder Discs' for your Auto Spring!

... make your car smooth floating even on roughest roads ... fit all cars with leaf springs ... the greatest improvement to riding comfort ... millions in use on passenger cars, trucks, ambulances and police cars ... approved by leading spring manufacturers ... \$2.50 post paid ... mention year and make of car ... No C.O.D. please...absolute satisfaction guaranteed or money back. Salsbury Corporation, 1161 E. Florence Ave., Los Angeles 1, Calif.

FREE—Amazing Book on RHEUMATISM, ARTHRITIS

If you suffer the aches, pains and discomforts of Rheumatism, as manifested in ARTHRITIS, NEURITIS, SCIATICA or LUMBAGO, send today for the FREE Book. It reveals important facts about why drugs and medicine give only temporary relief without removing causes. Explains fully a proven, specialized system of treatment that may save you years of distress. No obligation. Write for this FREE Book today!

BALL CLINIC, Dept. 36, Excelsior Springs, Mo.

SHINE WITHOUT 'POLISH'

New Invention! • Sells Like Wild



Replaces messy pastes, liquids. Simply glide over shoes—and PRESTO!—you have a lustrous, long-lasting shine. No mess. No muss. No soiled hands. Clean. Handy. **WORKS LIKE MAGIC!** For Men's, Women's and Children's Shoes. Low priced. Lightning seller!

SAMPLES FOR AGENTS Sample offer sent immediately to all who send name at once. A penny postal will do. **SEND NO MONEY—just your name.** KRISTEE CO., 717 Bar Street, AKRON, OHIO.

STEADY PROFITS

YOUR OWN BUSINESS WITH COVIDEO

Coin Operated
Television

Place these specially built television sets that play 30 minutes for 25c in the thousands of available public places, hotel lobbies, restaurants, etc. They yield immediate profits and steady income. Install Co-video, the finest made. Limited capital required. Send for further information. Write today.



COVIDEO Coin Operated Television, Dept. 8

212 Broadway, Phone: BEekman 3-0038-9
NEW YORK 7, N. Y.

HEY GUYS - LOOK!



THE FINEST SLING-SHOT MADE! STURDY—POWERFUL—ACCURATE

only
49¢
postpaid

Here it is—the sling-shot with the punch and killing power of a .22 cal. rifle. Heavy aluminum yoke. Slings are tough, powerful, red-tempered rubber. Chrome cured leather thongs. 6 extra slings. 2 extra thongs included. When ordering ask for details special offer.

Sling-Shot Co., Box 1029 8 Pittsburg, Calif.

URANIUM

A NEWLY DISCOVERED FLUX for the detection of Uranium, tungsten, titanium, cobalt, vanadium, and chromium enables you to make your own positive test in 5 minutes. Cash in on the Government reward for the discovery of acceptable uranium deposit. Why wait a month or longer for identification of these elements? Each U-W KIT contains chemicals and simple instructions enabling anyone to conduct conclusive tests NOW anywhere. Field kit, \$20.75; refills on flux and chemicals, \$5.25. C.O.D. orders accepted. Money back guarantee. eFOB.....m

THE U-W TESTING COMPANY

110½ Fayetteville

Raleigh, N. C.

Learn WATCH REPAIR



at the Jewelry Trades own school Operated and Sponsored by the Jewelers Associations of Chicago to give thorough training and INDIVIDUALIZED INSTRUCTION in all the Jewelry Skills.

JEWELRY TRAINING SERVICE

226 S. Wabash Ave.

Chicago 4, Ill.

OVER 500 SURPLUS BARGAINS



NEW! CATALOG

TERRIFIC BARGAINS for Sportsmen — Farm & Home greatest stock of Gov't Surplus for everyday use in America!

SEND 10c FOR YOUR CATALOG TODAY!

FISLER SALES CO. 723 Walnut St. Kansas City 6, Mo.

FREE TV



CATALOG & SAMPLE LESSON

RADIO
TELEVISION
TRAINING
ASSOCIATION

Dept. 158
972 BROAD ST.
NEWARK 1, N. J.

Rush me your FREE Catalog "How to Make Money in Television," in spare time, AT HOME, while learning; details FREE round trip to N. Y. C.; together with FREE Sample Lesson. I am under no obligation.

Name.....Age.....

Address.....

AUDELS Carpenters and Builders Guides 4 vols. \$6



Inside Trade Information for Carpenters, Builders, Joiners, Building Mechanics and all Woodworkers. These Guides give you the short-cut instructions that you want—including new methods, ideas, solutions, plans, systems and money saving suggestions. An easy progressive course for the apprentice and student. A practical daily helper and Quick Reference for the master worker. Carpenters everywhere are using these Guides as a Helping Hand to Easier Work, Better Work and Better Pay. To get this assistance for yourself, simply fill in and mail FREE COUPON below.

Inside Trade Information On:

How to use the steel square—How to file and set saws—How to build furniture—How to use a mitre box—How to use the chalk line—How to use rules and scales—How to make joints—Carpenters arithmetic—Solving mensuration problems—Estimating strength of timbers—How to set girders and sills—How to frame houses and roofs—How to estimate costs—How to build houses, barns, garages, bungalows, etc.—How to read and draw plans—Drawing up specifications—How to excavate—How to use settings 12, 13 and 17 on the steel square—How to build hoists and scaffolds—skylights—How to build stairs—How to put on interior trim—How to hang doors—How to lath—lay floors—How to paint.



Step up your own skill with the facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in a handy form, Fully illustrated and Easy to Understand. Highly Endorsed. Check the book you want for 7 DAYS FREE EXAMINATION. Send No Money, Nothing to pay Postman.

CUT HERE MAIL ORDER



AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for FREE EXAMINATION books marked (x) below. If I decide to keep them I agree to mail \$1 in 7 Days on each book or set ordered and further mail \$1 monthly on each book or set until I have paid price, otherwise I will return them.

Check NOW!

You Can
Look Over
Any Guide
In Your
Own Home

Start the
Easy Pay-
ments If
Satisfied

MAIL THIS TODAY



- ☐ CARPENTERS & Builders Guides (4 Book Set) \$6
- ☐ MASONS & Builders Guides (4 Book Set) 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
- ☐ OIL BURNER GUIDE, 384 Pages 1
- ☐ HOUSE HEATING GUIDE, 1000 Pages 4
- ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
- ☐ BLUE PRINT READING, 416 Pages 2
- ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
- ☐ SHEET METAL WORKERS Handy Book, 388 Pgs. 1
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pgs. 4
- ☐ AIRCRAFT WORKER, 240 Pages 1
- ☐ GARDENERS & GROWERS Guides (4 Book Set) 6
- ☐ AUTO MECHANICS GUIDE 4
- ☐ DIESEL ENGINE MANUAL, 400 Pages 2
- ☐ WELDERS GUIDE, 400 Pages 1
- ☐ MACHINISTS Handy Book, 1500 Pages 4
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pgs. 2
- ☐ MATHEMATICS & CALCULATIONS, 700 Pgs. 2
- ☐ MECHANICAL Dictionary, 968 Pages 4
- ☐ MILLWRIGHTS & Mechanics Guide, 1200 Pgs. 4
- ☐ POWER PLANT ENGINEERS Guide, 1500 Pages 4
- ☐ ENGINEERS & FIREMANS EXAMS, 528 Pages 1
- ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
- ☐ MARINE ENGINEERS Handy Book, 1280 Pages 4
- ☐ ENGINEERS & Mechanics Guides (8 Book Set) 12
- ☐ Answers on Practical ENGINEERING, 254 Pages 1
- ☐ ELECTRIC WIRING DIAGRAMS, 210 Pages 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages 1
- ☐ ELECTRICAL DICTIONARY, 9000 Terms 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages 4
- ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages 4
- ☐ ELECTRICAL POWER CALCULATIONS, 425 Pgs. 2
- ☐ RADIOMANS GUIDE, 975 Pages 4
- ☐ ELECTRONIC DEVICES, 216 Pages 2
- ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 18

Vols. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII \$1.50 Ea.

Name.....

Address.....

Occupation.....

Employed by.....

BRILLIANT SAFETY COLORS

NEW SCOTCHLITE REFLECTOR TAPE PROVIDES SAFETY AT NIGHT TIME!



REFLECTOR TAPE OF 1,000 USES!

Used on many of the newest outdoor advertising signs across the country, this famous Scotchlite Reflector Tape gives a brilliant, sparkling reflection 1,000 feet away at night. Now it is available to you for use on cars, trucks, bicycles, trailers, house numbers, mail boxes, and in many, many other ways. Get yours now—you get red plus silver—and you'll have enough glistening, radiant Scotchlite for the articles shown at left, with plenty left over for other things. You'll find a thousand uses for it—so order today!

COMPLETE INSTRUCTIONS FOR USE WITH EACH ORDER

36 SQUARE INCHES
SCOTCHLITE REFLECTIVE SHEETING

(Scotchlite made by makers of Scotch Tape)

ONLY
\$1.00

POSTPAID

JOHNSON and LOYD Dept. 8
3606 E. Pacific Coast Hwy., Long Beach 4, Calif.

BRILLIANT
PROTECTION
10 SECONDS
TO APPLY
LASTS FOR
YEARS

GUARANTEE!
Your satisfaction is guaranteed, or your money will be promptly refunded if returned unused.

Send 10c Today for Your Copy of New, Mammoth 1951 Catalog of Nearly 8,000 Novelties---Nearly 600 Pages

Collier's, Coronet, New Yorker, Tide Magazine Write About This Amazing "World's Most Unusual" Catalog

More interesting than carnival, circus, world's fair & science exhibit rolled into one. Odd hard-to-get novelties, gadgets, funmakers from all over world. More fun than reading best selling book. Costs us nearly \$1.00 a copy. You send only 10c for this big 600 page catalog—nothing more to pay or buy. Partial contents:

Accordions	Axes	Bags	Bugs	Cowboy Items	Flowers, Seeds	Flying	Home Repair	House, Model	Imported Goods	Indian Novelties	Indoor Games	Ink Novelties	Insect Killers	Itching Powder	Jewelry	Joke Novelties	Ju Jitsu	Key Chains	Kits, Hobby	Keys, Master	Knives	Labels	Lamps	Lenses	Letters, Sweater	Lighters	Monkeys, Live	Motors	Novelties, Various	Plating Equip.	Poker Items	Printing Items	Projectors	Purses	Racers, Auto	Rackets	Radio Items	Rasps, Etc.	Recipes	Religious Goods	Rings, Jewelry	Rulers & Rules	Scientific App.	Seeds, Plants	Sewing Items	Sharpeners	Shaving Goods	Ship Models	Shocks	Signs, Supplies	Skeletons	Skirts, Hula	Skull Novelties	Skunk, Live	Slide Rules	Smokers' Items	Snake Novelties	Sneezing Items	Soap Novelties	Spiritualism	Sporting Goods	Stamp Col. Items	Stationery Sup.	Sure-Winners	Surprise Package	Sweater Emblem	Swim Items	Tattooing	Taxidermy	Team Supplies	Telegraph Sets	Telephones	Telescopes	Television Items	Thermometers	Throwing Knives	Tie Novelties	Time Savers	Toys	Trapping	Treasure Finders	Tricks	Trophies	Turtles	Typewriters	Vaults & Banks	Vendors	Ventriloquism	Watches	Water Novelties	Weird Articles	Western Goods	Whips	Whistles	Wigs	Wrestling Items	& Many Others
------------	------	------	------	--------------	----------------	--------	-------------	--------------	----------------	------------------	--------------	---------------	----------------	----------------	---------	----------------	----------	------------	-------------	--------------	--------	--------	-------	--------	------------------	----------	---------------	--------	--------------------	----------------	-------------	----------------	------------	--------	--------------	---------	-------------	-------------	---------	-----------------	----------------	----------------	-----------------	---------------	--------------	------------	---------------	-------------	--------	-----------------	-----------	--------------	-----------------	-------------	-------------	----------------	-----------------	----------------	----------------	--------------	----------------	------------------	-----------------	--------------	------------------	----------------	------------	-----------	-----------	---------------	----------------	------------	------------	------------------	--------------	-----------------	---------------	-------------	------	----------	------------------	--------	----------	---------	-------------	----------------	---------	---------------	---------	-----------------	----------------	---------------	-------	----------	------	-----------------	---------------



10c

SEND 10c TODAY WITH YOUR NAME AND COMPLETE ADDRESS—NO LETTER NECESSARY
Big 600 page catalog of over 7000 novelties, 3500 pictures, 6-color cover, 1-inch thick. Send 10c at once—no obligation. (Postage stamps accepted).
Rush 10c with name & address today to:
JOHNSON SMITH & COMPANY, DEPT. 266, DETROIT 7, MICHIGAN



14K GOLD PLATED CHRONOGRAPH

\$3.95 • Jewel Movement • Assorted Radium Dials • 5 yr. Service Guarantee • Instruction Sheet • Copy of \$50 Watch • Brand New, Not Rebuilt (With strap and gift box 20c add'l). (With matching Gold Plated Link Expansion band \$1.00 add'l).

Above prices for orders of 6 or more watches, \$1 ea. extra on orders under 6.
10% with order, balance C.O.D.

A. DUNHALL IMPORTS CO., 101 Cedar St., New York 6, N. Y.

RHINESTONE DIAL WATCH

In 14K Gold Plated Case • Brand New • 5 Yr. Written Guarantee • 8 Flashing Rhinestones & 4 Simulated Rubies • Genuine Swiss Movement • Looks Like \$50 Watch • Individually Gift Boxed • Genuine Leather Strap (Matching Gold Plated Link-Expansion band \$1.00 add'l).

Above prices for orders of 6 or more watches, \$1 ea. extra on orders under 6.
10% with order, balance C.O.D.

A. DUNHALL IMPORTS CO., 101 Cedar St., New York 6, N. Y.



95 lb.
SET
\$10.80
Extra plates
10c lb.

BARBELLS

Save Money—Buy the finest barbell equipment direct from our foundry—No other company can match our low price or value!

Send to-day for our FREE Barbell Catalog

BUR BARBELL CO.

Lyndhurst 8, New Jersey

TREASURE -- \$10,000

New locator detects metals, valuable minerals and buried treasure. Money-back guarantee of superiority.



Also geiger counters. Govt. reward of \$10,000 for uranium discovery. Write for FREE information.

THE GOLDAK COMPANY

1544 W. GLENOAKS BLVD., GLENDALE 1, CALIF.

GOVT. COST
~~\$84.25~~



NOW
\$19.75

CHRONOMETRIC TACHOMETER

U. S. NAVY SURPLUS—ACCURACY—PRECISION—GUARANTEED

For PRECISION timing of all rotating mechanisms. Incomparable GUARANTEED ACCURACY of 1/10 of 1%. An RPM counter and surface speed indicator combined with chronometric operation which AUTOMATICALLY computes period of test in EXACTLY 6 SECONDS. No stop watch or personal equation necessary. UNSURPASSED for cameras, projectors, gen-

erators, motors, sanders, turbines, saws, shafts, looms, fans, lathes, etc. Packed in plush-lined, simulated leather case. UNCONDITIONALLY GUARANTEED subject to your inspection and approval. Manufactured by JAEGER and TOTCO, leaders in field of exacting measuring devices. Only \$19.75 Shipped postpaid in U.S.A. on cash orders.

ASTROGRAPHS

New in plywood cmpt. case. 14 1/2 x 11 x 10". Instrument adaptable for many useful gadgets. Govt. Cost \$300.00. Now **\$2.95**. 7 rolls Astrograph film-add **\$1.50**

COMPASS

Mark IV Self-Compensating Floating Compass. U.S. Navy. 3 1/4 x 3 1/2 x 3 1/4". For car, plane, or boat. Govt. Cost \$72.00 Now **\$4.95**

A-10 Bubble SEXTANT

Never before at this price! Complete with hardwood case. Gov't cost \$300. Now **\$7.95**

Kohlsman ALTIMETER



Ideal for Auto or Airplane. Used but GUARANTEED accurate. Don't wait. Order NOW! Original gov't cost, \$168. Each **\$10.95**

Order these surplus bargains today. We pay postage on cash tachometer orders. Add postage to other items. 20% dep. on C.O.D.'s.

Semlers' ASSOCIATED SURPLUS Dept. P-80 5720 WILSHIRE BLVD., LOS ANGELES 36, CALIF.



ATTENTION CRAFTSMEN! HOBBYISTS! THE SENSATIONAL NEW MINISAW

Now . . . the only miniature circular saw that actually does many things a big saw can do . . . and more! Most amazing practical home utility and light repair tool you ever saw! 3" circular blade cuts wood, soft metal and plastic up to 1" deep and at any angle up to 45°. Easy to attach. Fits Black & Decker and Skilsaw stands. Complete with attachments and **\$10.95** tilting saw table only.

Complete with saw and sander attachments \$12.95.

Black & Decker—Skilsaw Dealers—Write for amazing offer.

Specify make of stand when ordering.

Send check or Money Order to Dept. D

CLAYTON DIST. AND MFG. INC.

12548 Ventura Blvd.

No. Hollywood, California

FREE TRIAL OFFER OF ASTHMA MEDICINE

**For Those Helping To Prove
The Value Of This Medicine**

The D. J. Lane Co., is making tests to prove their medicine relieves most asthmatic wheeze and gasp for breath. They know no medicine relieves all cases, but wish to know what percentage is helped. Asthma sufferers making this test will receive postpaid a bottle of medicine. Test it ten days and if relief is obtained send them \$1.50. If not send a report stating your symptoms and saying "no help" and you owe nothing. Send name on the cent postcard to D. J. Lane Co., 187 Lane Bldg., St. Marys, Kans.

WALKIE TALKIES \$2.99 SET POCKET SIZE —ELECTRONIC VOICE POWERED

OF 2

—ELECTRONIC VOICE POWERED

No tubes, batteries, adjustments, license or permit needed! Should last for years.

Guaranteed to work anywhere up to 1/4 mile with extra wire. Clear tone. Swell for room to room—garage to house, etc! Your own private, talk-listen phone. Not war surplus. Brand new. Solid Aluminum Case. Guaranteed. Two absolutely complete units with wire—READY TO USE!

SEND \$1.00 deposit and pay postman \$1.99 plus postage charges or send \$3.25 for postpaid delivery. Ideal gifts for boys—girls. Order Now! Today!

THE MIDWAY COMPANY, Dept. WPS-S, KEARNEY, NEBRASKA

NOW AT MY RISK! I want you to read the WARNER SUCCESS PLAN



It shows you how to... **METALIZE BABY SHOES** AND OTHER KEEPSAKES

- how you can start in spare time with your home as headquarters.
- how to build—step by step—to big profits and personal independence.

This is the famous Warner Success Plan—the Plan for Personal Success in your own fascinating business that many men, married couples credit with freeing them from the limits of a pay check and from the drudgery of a time clock.

It gives the exact step by step instructions for starting a business in spare time—without risking the job or steady pay. It shows with pictures, photographs, and drawings exactly how to Metalize Baby Shoes and other keepsakes. It shows how to get the orders coming in—how to expand—how to get others working for you—how to be SURE of at least twice your present pay before you give up your job for a life of personal independence.

15 Million Prospects

There are 15 MILLION pair of Baby Shoes in the country right now ready to be Metalized. Last year alone, more than THREE MILLION more babies were born.

There's not one of these mothers who doesn't want her baby's first shoes preserved forever. The Business is tremendous... and never ending.

The Warner Success Plan shows you how to turn this exciting opportunity into cash. Shows exactly how to prepare the shoes, how to put on them a coating of genuine *gold, silver, or bronze metal* by simple Warner Electroplating process. Shows how to get the business coming in, how to start in spare time, how to pyramid profits. Shows you how the whole family can have fun while building for an independent future. My own Shop here in Chicago does a Big Business by the very secrets I will now unfold to you.

Read The True Facts

Don't say "Yes" now. You must have ALL THE FACTS. Then decide. First, I want you to read the entire Plan—at my risk. After investigating—after discussing it with your family—then and only then do you decide whether to use the plan and make the small investment necessary to start.



\$5.00
An Hour PROFIT

Yes, even in spare time it is possible for a man to finish enough work to pay \$5.00 an hour for his time. Think what this can pyramid into when the family helps.

3c MAY START A FORTUNE

Today I want you to do only one thing. Send the coupon. Let me give you all the facts. Remember, what I send you does not cost you a cent beyond the postage you put on your letter to me. With an opportunity like this, a man who has a serious interest in his future MUST investigate. MAIL the COUPON TODAY and see for yourself why so many families have called the WARNER SUCCESS PLAN a "godsend".

DON'T SEND A PENNY
JUST MAIL THIS COUPON TODAY!

Raymond E. Brandell, Mgr., WARNER ELECTRIC CO.
1512 Jarvis Ave., Dept. 2-0, Chicago 26, Ill.

As long as it doesn't cost me a cent, I am willing to read the facts, investigate, then give you my decision. Send the facts by next mail. Everything you send now is FREE!

NAME _____

ADDRESS _____

CITY _____ Zone _____ STATE _____

MAKE 12 TIMES YOUR MATERIAL COSTS

Remember, the Warner Process is not a cheap imitation "PAINT" process. It is the genuine METALIZING through real Electroplating. And in spite of being the best, your materials cost so little that your profits are 12 Times your material cost. Then, when mothers order the shoes mounted as book-ends, as pictures, as ash-trays or pen sets, you make the BIG EXTRA PROFITS on the beautiful mounts.

WARNER-ELECTRIC CO.
1512 Jarvis Avenue
DEPT. 2-0
Chicago 26, Illinois



WE SUPPLY ALL MATERIALS

You don't have to go "hunting" when Warner is behind you. We supply all materials, all mounts, chemicals, and metals. And you get the low prices made possible by our big quantity purchases and our own manufacture. You send for just what you need and never have any big investment tied up in stock.

Classified Ads only 80c per word per insertion,
payable in advance. Minimum ad 10 words.
To be included in October issue, copy should
be in our office by August 23rd.

CLASSIFIED OPPORTUNITIES

POPULAR SCIENCE MONTHLY-351 FOURTH AVE.-NEW YORK CITY 10

1 AUTOMOBILES

ENJOY New-Car pep and power in your old Buick. Same day service from world's largest stock of new (not rebuilt) Buick parts and engines. Ship anywhere. Dime brings catalog. Write today. Robertson Buick Co., 1002 S. Wabash Ave., Chicago 5, Illinois.

SILENCE Overhead-valves. Attachments unnecessary. \$2.00. Derderian, Box 542, Sandston, Virginia.

"WATER Injection." Also-Speed-Power-Economy-Methods! Free illustrated information. Neher Industries, La Verne 6, Calif.

SAVE Gasoline, oil, tires, brakes—New Illustrated Economy Manual. Get more power, speed, better automobile performance. Introduces 17 new Economy products—Super sparkplugs, Water-oil injector, Rocket booster, Mileage motor, etc. Special 50c. National Automotive Research Corporation, Venice 18, California.

SEE our ad under Motorcycles for Midget car bargains. Midget Motors Directory, Athens, Ohio.

SAVE Gasoline! Sensational Gane Needs. Free Trial—See page 30.

RACING Equipment from California—Speed-Dress-up Accessories for every make passenger automobile—Racing Ignitions, Carburetors, Flywheels, Camshafts, Water Injectors, Mufflers, Crash Helmets—Thousands of items in stock! Dual Manifolds (for Willys Jeeps to Oldsmobile Rockets)—Finned Hi-Compression Heads—covering 155 different makes and models. "1950 Illustrated Equipment Catalogue"—plus, "Driving Economy"—25c. (Dealers, request Wholesale Catalogue). Newhouse Automotive Industries, 5805-A7 East Beverly, Los Angeles 22.

"SPEED and Power" Handbook—128 enameled pages! Covers all makes of cars! Covers "Jet Propulsion"—"Racing Frames"—"Wheel Geometry"—"Dynamometers"—"Reciprocating Masses"—"Gear Ratios"—"Dual Pipes"—"Fuel Formulas"—"Porting—Balancing—Lowering—Relieving—60 Breathtaking Chapters. Authentic—By Automotive Engineers. Shows exactly how to build your own Dual Manifolds, Superchargers, Hot Cams, Water Injectors, Hi-Compression Heads, Mileage Devices! Save many dollars! Get up to ten more miles per gallon—racing speed, lightning acceleration, dynamic power increases from any make passenger automobile! Covers building fast Stock Cars, California Roadsters, 160 M.P.H. Rods! Construction drawings! Tuning Techniques! Speed Tricks! Economy secrets! Ingenious formulas! Library Edition—Includes, "California Automobile Customizing"—Color Photographs. (Newest ideas), Conversions, (Re-styling all makes). Including, "1950 Speed Equipment Catalogue." Plus—"Economy Handbook," and "Injection Information." 300 Illustrations. Five items, complete—\$1.98 postpaid. Newhouse Automotive Industries, 5805-A2 East Beverly, Los Angeles 22. (See page 40).

FREE Trial—10 days. Latest Chevrolet Speed-Power Manual! Ninety pages of accurate information on how to increase speed and power of any 1937 thru 1950 Chevrolet. Learn how to install late engines in pre-1937 chassis. Full data on cams, high compression, multiple carburetion, supercharging, ignition, etc. Proves that your Chevrolet can have superior power and speed. If you don't agree this is the finest Chevrolet manual you've ever seen—just send it back within 10 days. If satisfied, send \$2.00 to California Bill, Box A-7, Eagle Rock, Los Angeles.

HOT Rod Handbook and Catalog—Latest Speed Equipment, Hot Rod, Racing, Sports Car, Auto Parts and Hollywood Accessories! Color Pictures, "Professional Speed Secrets," Racing Engine Specifications, Customizing information! (Save up to 50%—Over 1000 Speed Items) Complete 25c. Speed Equipment Co., Drawer 716, Port Jervis 25Z, New York.

MODERN Motor Car Magazine—Facts, figures, photographs and features on all cars. Sample copy 25c; \$3.00 yearly. Crestline Publications, Box 581-B, Holliston, Massachusetts.

"SPEED Equipment" bargains—California mufflers \$4.50, V-8 Duals \$15.90, Chrome carburetor stacks 98c, Duals Manifolds \$9.95, Chrome echo cans \$1.55, Racing camshafts \$29.95 exchange, Hi-compression heads \$19.75. All popular brands—Big illustrated catalog 25c (Dealers Wanted). Almquist Engineering & Mfg., Milford 23Z, Pennsylvania.

CALIFORNIA Custom accessory headquarters. Buy direct from original designers and save. Chrome dash panels, solid hood sides, grille panels, speed equipment, dual pipes, push button door conversions, chrome motor accessories, fender skirts. 34 page illustrated catalog 25c. Eastern Auto, 3319D, South Grand, Los Angeles 7, Calif.

"S-P-E-E-D & Mileage" Manual—"Complete New 60th Edition, World Famous Power book, endorsed by champions!" Full speed, power, economy, increasing information for all passenger cars—Covers Speed Equipment construction—Speed Tuning—Race Car building—California Hot Rod Plans—"Custom Restyling"—Sports Car Conversions—etc. "Easily get super speed, mileage, acceleration—top racing performance from any car!" Shows inexpensive ways to build Speed Equipment, Superchargers, Dual Manifolds, High Compression Heads, Twin Mufflers, Racing Cams, Water Injectors, Economizers—Save 75%! Complete instructions with working diagrams on Engine Rebuilding, "Souping-up," Restyling, "Customizing," Gas Saving, "Racing Tricks," Fuels, "Cam Secrets," Balancing, Porting, "Jet" Formulas, Ratios, Frames, "Offys!"—Learn 100 ways to save gas! Reveals "Stock Car Speed Secrets!" California Speed Shop Methods! "Custom Styling Information!" Streamlining! Lowering! "Sport Changes!" "Hollywood Roadster Plans!" 200 h.p. Conversions—Fords, Chevs, Plys., etc. Large Photographs, Performance Charts, Blueprints, 200 illustrations—"Guaranteed finest, most authoritative Speed Book." (Worth \$10.00)—"Big Manual" plus Speed Equipment catalog, plus "Hot Rod Handbook"—all three only \$1.98. Almquist Engineering, Milford 21Z, Pennsylvania. (See Display Ad page 42.)

"If You Want To Go Let Us Know" Complete Line of Sport's Car, Stock Car, Road Car Equipment. Illustrated Catalog 25c. Dealer's Wanted, Hi-Speed Power Equipment, 228-20 Merrick Road, Laurelton L. I., N. Y. La-5-9535.

NEW Clymer Books—German Racing Cars and Drivers, prewar, postwar, \$2.00—Chevrolet Owner's Handbook gives service data all Chevrolet cars 1929 to 1950 including Powerglide, \$1.50—Catalog all new 1950 American Automobiles, photographs, technical descriptions, specifications, automatic transmission information, \$2.00—Grand Canyon Economy Test complete book results and technical information, \$1.50—Outboard Motor Complete Service Manual, \$3.50—Motorcycle Road Racing world famous riders, motorcycles, \$2.00. All Postpaid, Clymer, Dept. 8-B, 1268 So. Alvarado, Los Angeles 6, Calif.

NEW Book just out, "Special Racing Cars and Hot Rods of the World," 160 photographs, charts, drawings. Complete mechanical information cars of all nations. Supercharging, Engines suspension, transmissions. A "must" for every race car enthusiast. Postpaid, \$1.50. Clymer, Dept. 8-B, 1268 So. Alvarado, Los Angeles 6, Calif.

BIG new catalogue—over 500 racing hot rod speed equipment, Auto Park and Hollywood accessories, Pictures, Speed tips, Customizing, Mileage information, Lowest prices. Illustrated catalogue 25c. Almquist Engineering, Milford 25Z, Penna.

FREE Trial . . . Ford "Speed and Power" manual! We will send you on approval, 128 Page book full of cutaway construction drawings, photos, and understandable technical data. Includes information on installing V-8 motor in Model A chassis, hydraulic brakes for any Ford, roadster and fast car information. How to rework V-8, Mercury, Ford 6, Zephyr, Model A engines for speed. If you don't agree this is the finest hot rod manual you've ever seen—just send it back within 10 days. If satisfied, send \$2.00 to California Bill, Box A-7, Eagle Rock, Los Angeles.

2 AUTO SUPPLIES & EQUIPMENT

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Avenue K, Decatur, Illinois.

NEW "Economy and Power" methods—Free. Neher Industries, La Verne 6, Calif.

NEW and used guaranteed parts for civilian and Army cars and trucks. Largest stock in America. Mail orders. Pioneer Auto Wrecking Company, 788 W. 13th Avenue, Denver, Colorado.

FROM Speedway to Roadway! Track-proved hi-speed heads, manifolds now available for any passenger car! No special tools needed! Increase horsepower 25%! Astounding getaway! Free illustrated catalog. Speedsport, 6215-F Diversey, Chicago 39.

MOTORISTS save gasoline by Vacuumating overrich mixtures. Fits all cars. For Free particulars write Vacuumatic, Dept. 1640, Wauwatosa, Wis.

CUT Taxes. Keep auto-truck expenses at rock bottom, \$1.00. A. W. Winterfield Co., St. Paul 2, Minn.

SAVE Gasoline! Sensational Gane Needs. Free Trial—See Page 30.

CHEVROLET Parts. Scarce motor, body, sheet metal parts. Grossman Chevrolet, Minneapolis, Minnesota.

WELDING brings bigger profits to automotive shops. Easy to use Hobart Welders. Easy Terms. Catalog Free. Hobart Welders, Box P-805, Troy, Ohio.

BARGAINS in moneymaking arc welding. Electric or Gas Engine, AC or DC, portable or stationary. Write needs. Hobart Welders, Box P-804, Troy, Ohio.

RADIATORS—Rebuilt with new cores at wholesale price. Guaranteed. Custom Built Midgets, State Make-Year. Foster Radiator Serv., 970 Lamar, Memphis, Tenn.

WHEEL Alignment Recorder. Drive over, \$16.98. Guaranteed. Particulars free. Salesman wanted. Align-A-Matic, Box 94C, West Orange, N. J.

PISTONS—1907 to 1950 any make. Merryman Co., Lawndale, California.

JUST Out! Get largest auto accessory and parts catalog in world. Over 15,000 items, including Hollywood accessories, hi-speed equipment, rebuilt engines; all parts and accessories for all cars, trucks, New, used, rebuilt! We have that hard to get part! Completely illustrated. Jam-packed with bargains. Send 25c. J. C. Whitney Co., 1919-T Archer Ave., Chicago 16.

3 AUTO TRAILERS

BUILD Your own Trailer. Save Money. Have every feature you want! Plans for house, sport, camp and utility trailers. Catalog describing 9 models 10c, 15c in Canada and overseas. Jim Dandy, Box 125-B, Wausau, Wisconsin.

4 MOTORCYCLES BICYCLES, SUPPLIES

MOTORCYCLE Magazine—Worldwide Coverage. Yearly Subscription \$1.00. Sample 15c. Motorcycle News, 5424-H Sawyer, Chicago 25.

MOTORCYCLE pistons and parts, new, used. Harley, Indian, Henderson, Super-X, List 10c. Ballak, 811 N. 9th, St. Louis 1, Missouri.

1947 Salisbury motorscooter \$20 (needs engine repairs); James motorcycle \$25; Motorscooter \$15; Servicecycle \$30; Midget car kits \$25; Wards engine \$4, other gasoline engines as low as \$2. Send 25c (35c for First Class Mailing) for latest Directory Number Thirty-Six, just out, listing these and hundreds of other bargains in Midget Cars, motorscooters, motors, homebuilders parts, plans, etc. (Mailorder only). Midget Motors Directory, Athens, Ohio.

SPECIAL—1946 Whizzer in Schwinn bicycle \$20. Also Cushman motorscooter (good tires and lights) \$15; Shaw bicycle motor \$15; midget car \$15. Rush 25c (35c for first class mail) for new Summer catalog #17 listing many other amazing post-war bargains in wheels, engines, motorscooters, midget cars, motorcycles, motorcycles, etc. Gail, 538 Erie, Toledo, Ohio.

KNEE ACTION Moto-Scooter \$10; motorbike (front and rear brakes) \$5; Whizzer motorbike with clutch and all attachments \$25; Indian motorcycle \$30; good midget car \$35; tire-wheel combination \$2.50. Rush 25c (35c for first class mail) for new catalog #945 listing sensational bargains in motors, motorscooters, motorcycles, Servicecycles, midget cars, etc. Associated, Box 1764-CS, Toledo, Ohio.

SAVE \$100 on new Harley Davidson Lightweight 3 speed, two brakes, 100 miles per gallon. Was \$360—now \$259.50 FOB. Carl Bush, 518 Broad Street, Newark 2, N. J.

NEW Book just out, "The Sports Car Engine". Complete information Speed Tuning, Design, Maintenance all Sports Cars. Postpaid, \$1.50. Clymer, Dept. 8-B, 1268 S. Alvarado, Los Angeles 6, Calif.

5 AVIATION

PROPELLERS, Plans, supplies, for ice sleds, snow sleighs, air boats. Literature 20c. Banks-Maxwell, Box 3301, Ft. Worth.

7 ELECTRICAL SUPPLIES & EQUIPMENT

LAMPS—Building, wiring made easy by charts and directions in 56 page illustrated lamp parts catalog 25c. Gyro Lamps, 5402B Clark, Chicago 40.

32 VOLT appliances—World's largest line. Catalog Free. Haines Corporation, Dept. P, Minneapolis, Minn.

ELECTRIC Pencil: Engraves all Metals \$1.25. Beyer Mfg., 10511-C Springfield, Chicago 43.

WHAT Are your coins worth? Amazing Fell's United States Coin Book by Jacques DelMonte. Everything on every single coin minted—Worth, Value, How to Sell, Speculating, Investment; Other valuable facts on coins. Clothbound, 150 illustrations. Send No Money. Pay postman only \$1.50 (plus postage) or \$1.50 postpaid (refundable). Order Now! Fell, publ., 386B 4th Avenue, New York City 16.

FANS—Parts, Kits, assemblies. Bargain list 10c. Engineering Sales, Box 458, Hopewell 3, New Jersey.

LAMPS—Build own Originals. Parts Wholesale, any amounts. Catalogue 10c. Brown Lamp Co., No. 501, Wellston St., St. Louis 12, Mo.

8 WELDING, SOLDERING, PLATING

WELDING is profitable business with Hobart "Build Your Own" portable generator. Low cost. Write for free booklet. Hobart Welders, Box P-802, Troy, Ohio.

RADIATOR Repairing Books, Supplies, Equipment, Gasoline Torch. Write for circular. Curfman Mfg. Co., Marvill, Mo.

9 AIR CONDITIONING & HEATING

AIR Conditioner. Save \$300.00!! Build your own from junked Refrigerator. Send 50c for instruction Booklet. John Schmidt, 4809 N. Seeley Ave., Chicago 25, Ill.

10 MACHINERY, TOOLS, SUPPLIES

POWER Tools. Big savings when you build your own with Lewis castings, 23 wood and metal working tools with blueprints. Most can be completed with lathe and drillpress. Commercial quality. Ideal for home shops, schools, small manufacturing. Catalog 10c. Lewis Machine Tool Co., 3217 Union Pacific Ave., Dept. S, Los Angeles.

NEW! Drill Press Clamp for machines up to 15" replaces costly vises on all work to 2 1/2" thick. Maximum accuracy. Clamps thru table. Satisfaction Guaranteed. Set of 2—\$3.50, each \$1.98. Postage prepaid with cash. Machine Tool Accessories Company, 2215 Davis, Blue Island, Illinois.

LET us quote prices on your lathe jobs. Vine, Hill & Co., Box 35, Swanton, O.

CONVERT your Atlas Mill to vertical Milling & Slotting. Catalog Free. Montgomery, Machine Tool Accessories, 53 Park Place, N. Y. C. 7, N. Y.

100 ASSORTED Springs—\$1.10—Spring Distributors, Box 561, Pittsburgh 30, Pa.

13 BATTERIES, GENERATORS, ETC.

EDISON Nickel Batteries, 37 to 600 ampere. Also Kits with Edison Plates: make your own. Interesting literature. Hawley Smith Co., Croton Falls 2, N. Y.

14 BOATS, OUTBOARD MOTORS, ETC.

STEERING Wheels, windshield brackets, from \$6.95. Modern fittings "Water Skiis," at lowest prices. Complete pre-cut plywood boats. Bargains galore. Folder 10c. Marine, Box 681, Mendota, Minnesota.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

FULL size, cut to shape boat patterns, blueprints, 7 1/2-38 feet. Illustrated "Build a Boat" catalog, 25c (coin). "How to Build Boats" book, \$1.00. PolyWog Houseboat Plans \$10. Marine Catalog \$1.00. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland 13, Ohio.

MARINE and Industrial Engines, gasoline, diesel, guaranteed. J. Helwege Co., 1 Woodcleft, Freeport, N. Y.

BUILD a better boat than you can buy for the money, with Ozarka's exclusive laminated-rib construction and carefully pre-formed and pre-fitted parts. Save to 55% on all popular types from simple car-top models to one-design knockabout sailboats, priced from \$39.50 to \$329.00. Shipped complete, ready for easy assembly. Send 25 cents for literature, refunded on first purchase. Ozarka, Inc., 780 Borden Lane, Woodstock, Illinois.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Company, Department A, Newark 2, N. J.

SAVE 2/3 cost. Assemble your own boat. Complete plans and boat parts machined ready for assembly. No experience necessary. Rowboats to cruisers. Illustrated catalog 25c. Midwest Boat Company, Menomonee Falls, Wisconsin.

AUTO Conversions and Parts. Marine manifolds for all engines. V8—\$40 pair; Model A \$32; Willys \$30; 6 cyl. Chevrolet, Pontiac, \$50; 6 cyl. Buick, Lycoming, \$65; 8 cylinder Pierce, Packard \$80; Downdraft models add \$5. Your transmission converted to marine gear, most makes \$40, a few \$50; propellers 14"—\$13.50, 16"—\$16.75; shafts, struts, couplings, etc. Everything you need for your boat. Machine Shop Tools—15" x 6" lathe \$150—20" Upright drill \$140—Universal miller \$410—24" x 12" lathe \$360—4 ft. Radial drill \$460—Power hack saws \$80—\$125. Good machines, low prices, money back guarantee. Conversion Parts Co., 277 Adams St., Boston 22, Mass.

BOATS—Runabouts, row, car-top. Completely pre-cut kits from \$29.95 including freight and paint. Literature 10c. Minnesota Marine, 3207 Fremont St., Minneapolis 8, Minn.

KNOCK-Down Boat Kits, Outboards, Inboards, Sails, Hydroplanes. Easy to Assemble. Minimum costs. Catalog, Specifications, Prices, 25c. Brooks Boat Company, Dept. PS, Carrollton, Michigan.

15 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase, \$1.00. Motor Data, Box 7631, Kansas City 3, Mo.

BARGAIN 11 inch fan and 1/15 HP heavy duty Motor, 110V AC \$4.75. Motor only \$3.75. Kaynine Konvoy, Box 11302, Los Angeles 48, Calif.

MOTORS 1 horse \$35, 3/4 \$24, 1/2 \$15. Twin cylinder compressors \$17.50. Fans 32 volt \$3.75. Butler, 1885 Milwaukee, Chicago 47.

16 AMERICAN POLICE JIU JITSU

DEADLY Judo—Fiercest fighting technique. Trick knockouts. (Over 200 illustrated pictures.) Expert instructions—Three volumes Complete \$2.25. Variety House, Box 46-A Wall Station, New York 5.

18 BODY-BUILDING COURSES

BARBELLS—finest quality \$7.98 up. Catalog Free, Lurie Barbell Co., 1729-S8 Rockaway Parkway, Brooklyn, New York.

BARBELLS, Dumbbells, Exercise equipment, Courses. Free booklet. Good Barbell Co., Reading, Penna.

19 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY

190 PROFUSELY illustrated pages antique and modern pistols, swords, daggers, armor, etc. 50c. Robert Abels, PS860 Lexington Ave., New York 21.

SEND 10c for list 100 used guns. Frayseth, Wilmar, Minn.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 40c. Smith Museum, Runnemede, N. J.

"OVER 500 guns, modern, obsolete. List 10c coin. Ed Howe, 26 Main, Coopers Mills, Maine."

WORMS pay big. New book tells how. \$1.00. Delta 521, Carondelet, New Orleans 13, Louisiana.

SNOOPERSCOPE book \$1.50. Infrared catalogue 10c. Precise, 942 Kings Highway, Brooklyn 23, New York.

SLINGSHOT Pellets: For best results use "Tru-Flite" 23 grain lead pellets. 250 for \$1.00 postpaid. Send cash with order. Baron Industries, Box 3578-E, Cleveland 18, Ohio.

20 FIELD GLASSES, TELESCOPES, ETC.

TELESCOPES, Binoculars, Microscopes—big bargain catalog free. Brownscope Company, 24 West 45th Street, New York.

"FREE" Catalogue! Thousand war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send \$1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 93-08—95th Avenue, Ozone Park 16, N. Y.

SAVE 50% on new binoculars! Free catalog. Free book, "How to Select Binoculars." Write today! Bushnell Importers, 43-P8 East Green, Pasadena 1, California.

WAR Surplus Bargains, Binoculars, Telescopes, Sextants, Millions of Lenses, Prisms, Reticles, Eyepieces, Objectives, etc. Mail 10c for Big "Catalog CN" Send \$1.00 for Stock CN—10-piece Lens Kit and Big instruction Booklet. Edmund Salvage Co., Barrington, N. J.

SUN Projector lens doubles utility of all astronomical telescopes. \$2.00 postpaid. Suffolk Science Service, Riverhead, N. Y.

POWERFUL astronomical telescopes easily made. Perfect lenses and instructions; 100x \$3.00; 100x and 200x \$4.00; 100x, 200x and 400x \$6.00. Full power, clear vision guaranteed. Instructions alone 10c. Suffolk Science Service, Riverhead, N. Y.

REFLECTING Telescopes, completely assembled, 60X, \$25.00. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

GIANT, 100 power astronomical telescope with 6 ft. tripod (10,000 area magnification) Clear Vision, full power guaranteed, \$15.00 F. O. B. factory. Suffolk Science Service, Dept. TC, Riverhead, N. Y.

ASTRONOMICAL Telescopes, binoculars, microscopes; bought, sold, repaired. Books, lists 10c. Rasmussen-Reece, Amsterdam, N. Y.

TELESCOPES, 30 power, extends 36"; precision lenses. Satisfaction guaranteed or money refunded \$2.95 postpaid. Criterion, Dept. PSC 5, 438 Asylum, Hartford 3, Conn.

SAVE 50% on New Binoculars! Free Catalog. Free Book, "How to Select Binoculars." Write Today! Bushnell Importers, 43-P8 East Green, Pasadena 1, Calif.

ASSEMBLE and Save—Powerful 5" astronomical telescope kit; aluminized mirror, diagonal, eyepiece elements. Simple assembly directions, \$12.50. Other sizes available. Free bulletin. Rake Instrument Laboratory, 104 Booram Ave., Jersey City, New Jersey.

24 DOGS, BIRDS, PETS, RABBITS

MAKE Big Money! Raise Chinchilla Rabbits. Cash markets supplied for your production. Write today! Rockhill Ranch, Sellersville 16, Penna.

SEE Golden Hamster ad on Page 35. Shows picture of Hamster.

DOG Collars, Name address tags. Write. Free Bargain Catalog. The Dog Collar Works, Maysville, Ga.

\$50 WEEKLY Raising Angora or New Zealand Rabbits. Particulars free. White's Rabbitry, Newark 35, Ohio.

ANGORAS. Giant Chinchillas, White Giants—World's most profitable rabbits. Finest pedigree, heavy-producing, prize-winners. Literature free. Grinstead's Edwardsville, Illinois.

HAMSTERS and supplies. Breeding pair \$4.00. Literature, prices, 35 page hamster book 25c. Miami Hamstery, 216-D East High, Oxford, Ohio.

GENUINE Rat Terriers, Black and Tan, Caswell, 1013, Altoona, Penna.

RAISE Guinea Pigs. Money making business. Booklet free. Taylor, B426B, Hapeville, Georgia.

\$50 WEEKLY Raising Angoras. Free illustrated Booklet tells How. Wilson's, Stanton 18, Calif.

Hamsters—Money-making virgin stock. Free instructions each pair. Dixie Hamstery, 502-D Trinity Lane, Nashville 7, Tenn.

CALLING All Crows. Natural Kro-Kall \$1.50 Each postpaid. Tony Hoover, 1857 Portola Drive, Grants Pass, Oregon. Terms to Dealers.

LIVE Baby Alligators Make Welcome Gifts. Postpaid \$3.50. Magic Gift, 937 Washington, Miami Beach, Florida.

25 FROG RAISING

"RAISE FROGS!" New book tells how! Illustrated Literature Free. Marlboro-B, Box 7002, New Orleans 19, Louisiana.

30 FARMS, OTHER REAL ESTATE

STROUT'S Golden Anniversary Farm Catalog—Over 2800 outstanding Bargains! Coast-to-Coast; 32 states. Mailed Free! Strout Realty, 255-ZB-4th Ave., New York 10, N. Y.

OZARK Lands for All purposes. Actual river frontages, 5 acres \$90.00 and upwards. Free list and literature. Hubbard, 424-H, Minnesota Ave., Kansas City 4, Kan.

TEN acres \$250.00, \$10.00 down, \$10.00 monthly. R. W. Stewart, Inverness, Fla.

NEW Free Fall Catalog. farm bargains, many equipped, illustrated, many states! United Farm Agency, 428-PS BMA Bldg., Kansas City 8, Mo.

GOOD Farms—Ranches. Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Dependable Crops, favorable climate. Write for literature, lists describing typical farm opportunities. Specify which state. J. W. Haw, Northern Pacific Ry., 120, St. Paul 1, Minnesota.

32 PROFITABLE OCCUPATIONS

BE independent, be secure, have your own profitable business—earn \$10 and more a day making beautiful, fast-selling lamps at home. No equipment needed. Illustrated course teaches you quickly. Course, parts catalog, wholesale price list—only \$2. Gearon Co., Dept. 200-A8, 27 S. Desplaines, Chicago 6, Ill.

\$40.00 WEEKLY. Made growing mushrooms. Fresh. Dried. Dominion Patent 331,583, free spawn. North American, 169Y Yonge, Toronto, Canada.

LIFETIME income as Notary Public. Appointment assistance. Stationers, Helotes 50, Texas.

HAVE Fun! Make Money! "Working with Leather"—64-page booklet tells how. Send 25c for copy. Free catalog and valuable information included. Wilder-Craft, 1040 Crosby, Chicago 10.

TRAVEL free throughout world in post-war Merchant Marine. Vacation or exciting career. Salaries High. Men. Women. 1950 guide tells how. Only \$3 American Seamen's guide, 545 5th Ave., New York City.

RAISE Fishworms. Easy. Profitable. Send 25c in coin for complete instructions. Huffman's Worm Ranch, Rives Junction 5, Michigan.

LEARN Building Design. or design your own home or cabin. Tech-Talk Design, 19375 Charleston, Detroit 3, Mich.

MAKE big money cleaning rugs, furniture and car body interiors. Send \$1.00 for box of chemical which will make ten gallons of cleaner. No mechanical equipment needed. Ralph Ziske, 15821 Indiana Ave., Detroit 21, Michigan.

EASY to Learn profitable arc welding in short time at low cost. V-A contract. Catalog Free. Hobart Trade School, Box P-803, Troy, Ohio.

\$5000 FROM half acre growing Ginseng. crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

FREE book "How to Make Money With Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make. How to sell workshop output spare time. Write at once for details. Remember it's free! Craftsman, 115-B7 Worth St., New York City.

"FULLFASHION Nylons", \$1.00 doz. Socks 95c doz. Combs 20c doz. Rayon Panties \$3.50 doz. Men's underwear \$3.50 doz. Chenille Spreads \$2.50. Quilt Tops 39c. Sample Razor Blades, complete stock. List, 25c. Sibert Company, Chattanooga 4, Tenn.

33 BOOKS, PERIODICALS, ETC.

MAGAZINES (back dated)—foreign, domestic, arts. Books, booklets, subscriptions, pin-ups, etc. Catalog 10c. (refunded). Cicerone's, 86-22 Northern Blvd., Jackson Heights, N. Y.

"ADULT Stories." 25c. Ten—\$1.00! Free lists! Hirsch, Spring Valley 3, N. Y.

ADULT Books—Unusual—Revealing—illustrated. Five \$1.00. Catalogs 10c. Kogan, 1032-DP, Church Annex, New York 8.

NATIONAL Geographic Magazines. 1888-1950, any issue. Periodical Service, Box 327-PS, Swarthmore, Penna.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

ART Models—"Close-Up Photos." \$1.00. Steele, Box 4763-F, San Francisco.

HARD-To-Find Books supplied. Send wants. Pierce's, Winthrop, Iowa.

BACK-date Magazines. Specific issues; years. Arkell's, Tarzana 2, Calif.

UNUSUAL Books, Novelties, Curios. Illustrated Catalog 50c. (Refundable) Box 216, Herkimer, New York.

AMAZING New Magazine. No other magazine in the world like new "Here's How". Every page devoted to schemes, plans, ideas for making money—at home or outside, full or spare time. Tells how to start own business—how to sell personal service—how to make homecraft pay big profits—how to quickly win financial independence. Every story and article practical, stimulating, inspirational. Get copy of first issue of "Here's How" just off the press for only 25c. One idea in this amazing new magazine may be worth \$1,000 to you. Be first in your locality to read "Here's How" Rush name and 25c today to Raymond Brandel, Publisher, 1512 Jarvis Avenue, Dept. CL-3, Chicago 26, Illinois.

"THRILLING, Sensational, Cuban-Mexican Art" Pictures, Books, Miscellaneous. samples, lists \$1.00—\$2.00. Jordanart, Box 1265-P, Boston 4, Mass.

35 MAGIC TRICKS, PUZZLES, ETC.

WE supply every noted magician. Large professional catalog 50c. Holden's, P220 West 42nd Street, New York.

MYSTIFYING Ace Disappears from between two Cards instantly. Complete Trick Easy to do FREE if 25c is sent for Big Catalog 500 Amazing Magic Tricks. The Magician, 2463-S Kensington Ave., Philadelphia 25, Pa.

200 ELECTRIC stunts. 110 volts. \$1.00. Cutting Sons, Los Altos 2, Calif.

MAGICIANS' Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 10c. Book Co., Box 671, St. Louis 1, Mo.

BIG Magic Catalog and book "102 Easy Tricks" Both only 50c. Robbins Co; 131-R West 42nd Street, New York.

JOIN our New Magic Club. Send 10c for illustrated catalogue and Free particulars. Magic & Fun Mart, 53-B Prince St., N. Y.

500 TRICKS. Douglas famous catalog 27 now only 10c. Unequaled service to magicians for 30 years. Send 10c today. Douglas Magicland, Dept. 2, Dallas, Texas.

VENTRILOQUISM Taught. 3c stamp brings particulars. Smith, 801 Bigelow, Peoria 5, Illinois.

LEARN Ventriloquism. Make Money! Have Fun! Big Opportunity. Radio, Television, Stage Appearances. Free information. Write stating your age. Dummy Catalogue 25c. Maher, Box 36-S80, Kensington Station, Detroit 24, Michigan.

FREE!!! Hot pepper gum. 24 other tricks, with illustrated catalogue 25c. (refunded first order). Pink Co. (B-1618). Philadelphia 5, Pa.

VANISHING Quarter trick and catalog 25c. Sterling Magic Co., Royal Oak, Mich.

MAGIC package "Extodo" unique tricks 50c. Catalog free. Magiden, 716 Pine, St. Louis, Missouri.

512-PAGE catalogue of 2500 tricks, pocket, parlor, stage. World's Finest Magic. Send \$1.50 for catalogue (refunded first \$6.00 order). Kanter's, S-1311 Walnut, Philadelphia 7.

BE a Magician. Large professional magic catalog of latest tricks. 35c. Ireland, F-109 North Dearborn, Chicago.

FREE monthly mailings informing you of latest magical inventions. Aim Magic Company, 143 Verona Ave., Newark 4, N.J.

37 COIN COLLECTING

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-D50, Mass.

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 50 years.

ANCIENT Roman coins 2000 yrs. old, 2 small \$1.00, 1 large \$1.00, 10 diff. \$4.00, 33 diff. foreign \$1.00, 100 diff. foreign \$3.00. Chelsea, 26 W. 18, New York 11.

100 COPPER and Silver Foreign Coins sent in trade for any amount of old gold sent us. B. Lowe, Holland Bldg., St. Louis 1, Mo.

U.S. coins lowest prices. Send stamp for lists. Hutchinson, 3463 I Street, Philadelphia 34, Penna.

COIN Collector's monthly magazine and two wooden nickels 10c;—six nickels 25c. Lawrence Brothers, Anamosa, Iowa.

OLD Money Wanted. Will pay \$100.00 for 1894 Dime, S. Mint, \$50.00 for 1913 Liberty Head Nickel (not Buffalo). Big premiums paid for all rare coins. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Texas.

40 STAMP COLLECTING

200 DIFFERENT, including Roosevelt triangle, 5c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

WOW! \$10.00 Worth Of Fun 10c! What a treasure hunt! Big package 500 Foreign Stamps, including airmails, pictorials and others from the world over; stamps worth up to 25c each. This offer sent for 10c to Approval Applicants Only. Jamestown Stamp Co., Dept. 5, Jamestown, New York.

POSITIVELY Greatest Free Offer! Latest Scott's International \$6.00 stamp album—covering entire world, contains 36,000 illustrated descriptive spaces; Scott's 1950 Standard \$7.00 catalogues "Philately's Encyclopedia"—absolutely Free to applicants for foreign approvals becoming customers. Approval Service, P. O. Box 1700, San Francisco, California.

FREE! Powerful magnifying Glass—to approval applicants; also big bargain lists. Jamestown Stamp Co., Dept. 202, Jamestown, New York.

"HOW To Recognize Rare Stamps" Book Profusely Illustrated Only 10c. Kenmore, Arlington 74-H9, Mass.

FREE! 100 Worldwide different stamps to approval buyers. Big U.S. and illustrated bargain lists sent with approvals. Bookman, Maplewood 1, N.J.

FREE—Famous Americans Set, Flag Set, National Parks Set, and Presidential Set to \$5.00. A total of 90 Stamps Free to Customers for our unsurpassed U. S. and foreign selections. Send 3c for 15 of the above Stamps and full particulars. Triboro Stamp Co., 145 Nassau St., Dept. 208, N. Y.

WORLD'S Largest Stamp (7½ x 14 inches): A real curiosity! Retail for 50c, only 3c to approval applicants. Tatham Stamp Co., Springfield 50, Mass.

DEALERS Wholesale catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

FREE—Rare stamps from mysterious Nepal, plus octagonal (eight sided stamp). Giant triangle, gorgeous diamond, mammoth, midget stamps, value exceeds \$2.00. All free to approval buyers. Stamps, Box 58, Santa Ana, California.

1050 DIFFERENT Stamps given to approval applicants becoming customers. Send 3c for particulars, lists and approvals. Bryson Stamp Company, Drawer F-30, Rossford, Ohio.

FREE \$25.00 Outfit Latest Large Scott album, valuable collection of 1050 all different beautiful stamps, airmails, triangles, diamonds, high values, etc. Plus watermark detector, tongs, "Stamp Finder" Magnifying glass, perforation gauge, hinges—actual value over \$25.00—but all absolutely free when you become a customer. Write for our foreign stamps on approval now. Americas' Stamp Service, Riverside, California.

TOPS! Our book "How to Collect Stamps". Send for your free copy today! Littleton Stampco, Littleton 29, N. H.

FREE—Cuba Roosevelt issue and illustrated catalog. Littleton Stamp, Littleton 11, N. H.

FREE—Illustrated Catalog! Kenmore Stamps, Arlington 74-C8, Mass.

200 BRITISH Empire Stamps plus valuable publications only 3c. Kenmore Stamps, Arlington 74-B18, Mass.

100 EXOTIC Japan—All different—10c. Kenmore, Arlington 74-K8, Mass.

FREE Scott's International Album, valuable colorful collection, hinges, other big premiums. Full particulars with approvals. Raymax, 123-X William St., N. Y. C. 7.

FREE—Canadian Sets Royal Visit, George VI, George V, Coronation Jubilee, others to approval applicants. Ensign, Box 118-P, So. Orange, N. J.

POUND stamps containing thousands \$1.00. Longacre Shop, 100c West 42nd, New York City 18.

500 DIFFERENT Hungary, 50c; 500 different Austria, \$1.20; 300 different Belgium 90c. All three \$2.75. Skol Stamp Co., Box 62, Canal St., Station, New York 13, N. Y.

NIGERIA UPU Plus 100 different British Commonwealth only 10c. Approvals. Allmendinger, 709 Dover, Philadelphia 31, Pa.

3 GOLD-Silver Giant Triangles—3c. Approvals, Iroquois, Baltimore 5, Md.

FINE Approvals. Fast, personal service. What countries do you prefer? I'll send their stamps. Milton Skinner, 438 Locust, Long Beach 12, Calif.

GENUINE "Goya Nude" set (Catalogs 55c) 15c. Approvals. Royal Stamp Company, Tamaqua 2, Penna.

10,000 DIFFERENT 1c each! Gordon Davison, Box 1919, Manchester, N. H.

OLD, scarce U. S. seconds on approval. Slightly defective bargain prices. Hearshfeld, Clintonhill Station, Newark 8, N. J.

PENNY Approvals By Country. M. H. Hoerning, 102, Farmington, Arkansas.

102 "GOLD" Triangle, Diamond, others—5c. Piety, 215 Ocean, Laguna Beach, Calif.

SPANISH Morocco U. P. U. 10c. foreign approvals accompany. Short, 7690 A St., Hayward, Calif.

WORLD WIDE Stamp List! Sample packet 25c. General Sales Service, 423 Brobst St., Shillington, Pennsylvania.

SAN MARINO Collection Free—25 Different Old and New Issues, Airmails, Commemoratives. High Values—Absolutely free with approvals. Viking, 130-PP Clinton St., Brooklyn, N. Y.

WONDERFUL Offer 7 complete Mint Sets Manchukuo, Bohemia and Moravia and Germany, only 10c with approvals. Reich Stamp Co., 4647 Kenmore, Chicago 40, Illinois, Dept. S23.

THOUSANDS of beautiful stamps at only 1c each—Why pay more when you can get the best for less. Write today for approvals—Economic Approvals, Box 168, Riverside, California.

307 ALL Different 15c. Beautiful collection of commemoratives, triangles, high values, bicolored stamps, etc., only 15c. Garcelon, Box 418, Calais, Maine.

DUTCH Treat, 25 better Netherlands. A real buy including fine commemoratives only 10c with approvals. Myers (Box 22) Lansdowne, Pennsylvania.

500 DIFFERENT Stamps, only 25c with priced-right approvals. Niagara Stamps, Niagara-on-the-Lake 20, Canada.

FREE! Beginner's Packet! With Lists! Stampmart, Box 2071, Hartford 1, Conn.

GIGANTIC! Wonderful! Penny Approvals! Sensational bargains cataloging to \$1.00. Commemoratives, Pictorials, Airmails, Free! Premiums! Price Lists! "Perforation-O-Gauge"! Waynesco, Box 7008 Long Beach, California.

STAMP Magazine! Copy Free! "Stamp Post", South Catalina, Pasadena 1, Calif.

"RUBBER Stamps, Beautiful lettering, for letterheading, \$1.50. E & A Stamp Co., 4845 Haverhill, Detroit 24, Mich.

FREE "Stamp Finder." Tells instantly country to which any stamp belongs. 32 pages profusely illustrated. Garcelon, Calais 18, Maine.

FREE Sample newsy, informative stamp weekly. Southern Philatelist, Box 1948, Miami 35, Florida.

FLAG Stamp free with your request for U. S. approvals. Wenigman's, 1933 Patterson, Chicago 13.

15c-1c APPROVALS! Bargains Galore! Cole, 43-G Rinewalt, Buffalo 21, N. Y.

GIANT, midget, triangle, diamond, other odd stamps. Free with tiptop approvals. Niagara Stamps, Niagara-on-the-Lake 13, Canada.

WORLDWIDE Stamps, All Different, 200—25c; 500—50c; 1000—\$1.00; 2000—\$2.50; 5000—\$12.50. Beacon Sales, Northboro 3, Massachusetts.

BIG U. S. illustrated catalogue free. Stone, Box 52-S, Dorchester 24, Mass.

SOUVENIR Sheet Free. Request approvals. Knight, Box 3770, Portland 88, Oreg.

MOZAMBIQUE triangulars, unused set 10c with approvals. Vargo Stamps, 6044 South Fairfield, Chicago 29, Illinois.

110 DIFFERENT Hitlers, Roosevelt, Liberia, Haiti, etc. 10c. Buckley, PS-208 Ludlow Bldg., Dayton 2, Ohio.

FREE! Scarce Atomic Bomb Airmail! Approvals. Star Stamps, Jamestown, N. Y.

AMAZING Offer! 500 United States stamps—including commemoratives, airmails, high values to \$5.00—Only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

FOREIGN stamps on approval. Kansas Stamp Co., Box 422, Hutchinson, Kansas.

UNITED States \$4, \$5 and \$10 stamps free to approval buyers sending 5c for United States Packet. Wineholt, Woodbine, Penna.

500 JAPAN Stamps—10c. Kenmore, Arlington 74-J13, Mass.

BARGAINS! 2,000 Foreign stamps \$1.00, 5,000 \$2.00, 2,000 U. S. \$1.00, 5,000 \$2.00. Postall Sales Company, Department 4023, Washington 13, D. C.

500 STAMPS For Only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange countries cataloguing up to 25c each!! Also approvals. Mystic Stamp Company, Camden 55, New York.

42 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 631-E St., N. W., Washington 6, D. C.

50 DIFFERENT Army Embroidered Patches \$1. Other bargains. Insomnia Mart, 703B Broadway, New York 3, New York.

WANTED Old cigarette cards. Write Charles Bray East Bangor, Penn.

CASH from your hobby! Free details. Solle's, PS-1, Omena, Michigan.

44 ANTIQUES, RELICS, INDIAN GOODS

8 ANCIENT Indian arrowheads, \$1.00. Tomahawk \$1.00. List free. Lear's, Glenwood, Arkansas.

46 MINERALS & PRECIOUS STONES

"GENUINE" deep red Arizona Rubies (Garnets). Send quarter for packet, Box 724, Scottsdale, Arizona.

35 COLORFUL Western Minerals Specimens, identified, carded, boxed, \$3.00 Postpaid. H & B Minerals, 714A Houston 6, Texas.

GEMSTONES. Mineral specimens. Every variety. Lowest prices. Postcard brings free booklet. Plummer's, 2183D Bacon, San Diego 7, Calif.

AUSTRALIAN opals from Lightning Ridge Cooberpedy, Andamooka. Send air mail for free gem and jewelry list. Oldfield's, 11 Cherry Road, Balwyn, Victoria, Australia.

47 CAMERAS, PHOTO SUPPLIES

BASS Says: Bargaingram 257 ready and waiting for you. The book which tells all the finest in new and used camera equipment, a veritable encyclopedia. Write, phone or call the sign of the old "Horse Trader". 39th year of satisfaction or your money back dealing. Bass buys, sells and trades. Bass Camera Company, Dept. AG, 179 W. Madison St., Chicago 2.

FREE Photographic Bargain Book packed with hundreds of sensational values in still and movie cameras, lenses and latest accessories. Super savings for you in new and used equipment. Liberal trade-in allowances, too, on your equipment. Write now for your free copy to Central Camera Company, Dept. 11-H, 230 S. Wabash Ave., Chicago 4 (Photographic Headquarters Since 1899).

FREE Photo Supply Catalogue. Gruber Camera, 210 Washington St., Newark 2, N. J.

ULTRA Powerful Telephoto Camera easily made. Trifling cost. Perfect pictures. Instructions 10c. Suffolk Science Service, Riverhead, N. Y.

KODACHROME slides of Mexico on approval. Douglas Whiteside, Yosemite, Calif.

PHOTOMURALS. Your negatives or ours. Catalogue 25c. Photomammoth, 12048 Vanowen St., North Hollywood, Calif.

16MM CINE Kodak Magazine Camera, F/1.9, case, immaculate, \$99.50. Write for catalog of outstanding photographic values. Empire Camera Exchange, Dept. PS-7 74 E. Post Rd., White Plains, N. Y.

48 PHOTO FINISHING

YOUR 8 exp. roll with 3 prints each good negative 45c. 2 each good negative 35c. One each good negative 25c. Reprints 3c. A few cents postage appreciated. L. A. Eastman, Bode, Iowa.

16 DECKLEDGE Velox prints from any 8 exposure roll film developed 30c. 10c package of 100 mounting corners free. T. Skrudland, Lake Geneva, Wisc.

QUALITY developing of your roll, and 8 brilliant Jumbo Enlargements, in Plastic Ring-Bound Album, only 35c post paid. Same Day Service! Calvert Studios, Box 1150, Binghamton, N. Y.

OIL coloring photographs can be a fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Send for free booklet. National Photo Coloring School, 1315 Michigan, Dept. 172-C, Chicago 5, Ill.

GREAT News! New low price on our famous Jumbo Oversize finishing. New Chicago plant with latest, exclusively-improved equipment produces new high-quality work, 8-exp. roll deluxe finish only 30c, 12-exp. 45c, 16-exp. 55c, 36-exp. \$1.25. Oversize reprints 4c. Send us your next order, magnificent results will delight you. Century Photo Service, Box 5208, Chicago 80, Ill.

UNBEATABLE for Quality and Price. You will be surprised and pleased with the beautiful results from our celebrated Jumbo Oversize finishing. New low prices, same as contact, 8-exp. roll superfine finish only 30c, 12-exp. 45c, 16-exp. 55c, 36-exp. \$1.25. Oversize reprints 4c each. Send us your order, you will be delighted. Free Mailers. Mailbag Film Service, Box 5440A, Chicago 80, Ill.

2 BEAUTIFUL Hi-Gloss prints each good negative and enlarging coupon with each 6 or 8 exposure roll developed 28c. Owl-photo Co., Weatherford, Oklahoma.

ALBUM free. King size prints at contact price. All Eastman materials and processes, 8 exposure roll 35c. Reprints 4c each. Fast service. Dept. A, Rochester Photo Service, Box 290, Rochester, N. Y.

8 BEAUTIFUL Double Size pictures and roll developed 30c, 8 hour service. Free Mailers. Pacific Photo Service, Box 666, San Francisco, Calif.

ROLL developed 16 prints 25c. Reprints 2c. Dick's Photo, Louisville 12, Ky.

50 PHOTOPRINTS, PHOTOCOPIES

24 GLOSSY Photos, Beautiful Models \$1.00—illustrated catalog 25c none free. Irving Klaw, Dept. DB-16, 212 East 14 St., New York 3, New York.

PHOTOCOPY anything yourself. Papers, books. No darkroom. 8 1/2 x 11" complete. \$6.95. Fotoflek, 3751 St. John's Terrace, Cincinnati 36, Ohio.

51 MOTION PICTURES, SOUND EQUIPMENT

FILM Duplicating Machines \$68.50 Up. Details (M-K) 451 Continental, Detroit 14, Michigan.

GUARANTEED fresh anti-halo outdoor movie film! Weston 16! Daylight loading! Processing free! Three spools double 8mm. \$4.50! Six single 8mm for Univex. \$4.60! Postpaid! Catalog. Eso-S, 47th Holly, Kansas City 2, Missouri.

BASS Says: 39 years of leadership guarantees satisfaction. Finest Cine equipment, 8mm., 16mm., and 35mm., silent and sound. Write the old "Horse Trader". Satisfaction or your money back always! Bass Camera Company, Dept. A., 179 W. Madison St., Chicago 2.

BETTER 8mm and 16mm Movie Camera Film. Free Equipment Catalog. Better Films, 742 New Lots, Brooklyn 7, N. Y.

WILD Game films, 8mm, 16mm, Natural color, black-white. Taken in natural habitats by famed Eberhart organization. Send for free list. Wild Life Films, Dept. 8-PS, 6063 Sunset Blvd., Hollywood, Calif.

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue. (sample film 10c). Garden Film, 317 West 50th, New York 19.

ADD "Spice" to home projection shows with old time nickelodeon slides, 2 x 2 Kodachrome. Write for free list. Nickelodeon Co., New Flender Bldg., Portland 5, Oregon.

16 MM HOME Movie of professional Lady Wrestlers, High Heels, Fighting Girls etc. Illustrated catalog 25c none free. Irving Klaw, DP-17, 212 East 14 St., New York 3, New York.

NEW \$17.50 16mm. sound musicals, cartoons, \$9.95, \$8.95, New \$9.75 sound cartoons, \$5.95. Big bargain list free. Blackhawk Films, Dept. PSE, Davenport, Iowa.

RENT 16mm. sound films 50c reel. Large selection; free catalog. U. C. Film Service, 128 Chestnut St., Roselle Park, N. J.

SUNSHINE and health Films available in 8mm and 16mm Tel-A-Film Co., 935 Cincinnati St., Dayton, Ohio.

RENT 16mm Sound Films 50c Reel. Rogers Films, Box 26, East Atlanta, Ga.

BARGAINS! Bargains! Bargains! Free catalog. Towers, 935 North 40th, Phila. 4.

SNAPPY films 8 and 16mm. Free list. Sherman, Box 11463P Briggs Station, Los Angeles 48, Calif.

UNUSUAL Glamour films of beautiful models. Send 25c for giant Catalogue. Kanan Distributing Co., 1248 Pacific St., Brooklyn, N. Y.

SELL Cameras, Projectors, Film, Recorders, Typewriters, Appliances, Revere, Kodak, Weston, Royal, G.E., 25-40% Commissions. Diamond Company, 17 East 42nd Street, New York 17, New York.

ART model films 16mm rentals exclusively. adults list. Enclose stamp. Revere Films, Box 1051, Detroit 31, Mich.

LATEST Glamour Film Bargains. "Saucy But Sweet", "Beach Blonde", "Silk Hose Honey", "French Fantasy", "High Heels" and "Shapely Siren". Starring lovely models. 16mm/100' \$6.50, 8mm/50' \$3.75. Special, all 6 films in 16mm for \$30., all in 8mm for \$16.50, 25c brings you exclusive, giant catalog. Empire, Dept. PS-6, Box 23, White Plains, New York.

ONLY at Camera Corner can you get these new, exclusive unusual model movies—never offered before. "Atomic Eve", "Daring Darling", each, 8mm \$2.75, 16mm \$6.00. Send 25c for sample strip and two-color brochure of titles available only from us. "Previews" #1 to #9—our famous projection-length sample shorts—still available at 50c each. (Specify 8mm or 16mm) Film strip viewer, \$1.00, Camera Corner, 391 Bridge Street, Room 131, Brooklyn 1, New York.

52 MUSIC, MUSICAL INSTRUMENTS

SWISS Music Boxes \$1.00, Catalog 10c. Bell Music, Box 49, Planetarium Station, New York 24, New York.

53 SONG WRITERS

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

POEMS Wanted to be set to music. Free examination. Send poems, McNeil, Master of Music, 510-PS, S. Alexandria, Los Angeles, California.

POEMS wanted for musical setting. Send poems for free examination. Five Star Music Masters, 646 Beacon Bldg., Boston, Massachusetts.

NEW, interesting recording deal. Details, Turner, P. O. Box 2201-S, Bridgeport 8, Conn.

POEMS Wanted. Percentage basis collaboration. Terry Tunesmith, 709 1/2 North Broadway, Oklahoma City 2.

POEMS Considered for musical setting. Send poem for Free examination and useful Rhyming Dictionary. Richard Brothers, 46 Woods Building, Chicago.

54 RADIOS, SUPPLIES & EQUIPMENT

TELEVISION Antenna Kits. All parts for installation. Write Box 65, Buckingham Valley, Pennsylvania.

BUILD 15 Radios for \$14.75. Practically a Radio Course. No Knowledge of Radio necessary. Free Tester & Tools. Quizzes. Money-Back Guarantee. Order today or send for free kit catalog. C.O.D.'s accepted. Progressive Electronics Co., Dept. D, 497 Union Ave., Brooklyn 11, N. Y.

FREE—Send for latest radio catalog and bargain bulletin. Has thousands of top values in television, radio electronic supplies. Concord Radio Corp., Dept. KH-50, 901 W. Jackson, Chicago 7, Illinois.

MAKE simple, tubeless, batteryless, distance-getting crystal radios. Crystal and illustrated instructions 25c postpaid. Allen, 426-S, Clinton, Mo.

55 TELEVISION

FOR the world's greatest value in television, buy Admiral. Send for free pamphlets. Free precision antenna with any Admiral Television set purchased from us. Barclay Appliance, 180-24 Union Turnpike, Flushing, New York.

56 BUSINESS OPPORTUNITIES

"HOW to start a successful mail order Business! The guide to sound, profitable mail merchandising. 25c. Manhattan House, P. O. 50 New York 28, New York.

LAMPS—earn money building and repairing in your home. Easy-to-understand wiring charts and detailed instructions in illustrated catalog showing all parts. Send 25c. Gyro Lamps, 5404 B Clark, Chicago, Ill.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

GOOD Paying Business Silvering mirrors, plating autoproducts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E, Decatur, Illinois.

EXTRA Money—No selling—operate vendors. Amazing profits, details Free. Silver King, Suite 282, 622 Diversey, Chicago 14.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

A FACTORY in your home garage! Mfg. and sales rights, mechanics' waterless hand cleaner, glass cleaner, and amazing "lazybones" auto cleaner-polish. \$500-\$800 monthly. No special equipment necessary. All formulas free. Western Aircraft Mfg., Dept. G, Los Angeles 6, Calif.

ENVELOPES addressed accurately, reasonably. Fast Service. We have capable addressers in your city. Glenway System, 5713-X Euclid, Cleveland 3, Ohio.

POPCORN Equipment, Potato Chip Outfits. Long Eakins Company, 5063 High, Springfield 99, Ohio.

BIG money! Spare or full time in your home. No Selling! Spray New Miracle Finishes, Plush and Suede, on signs, radios, automobiles, figurines, lamps, toys, etc. Our business is booming. Help us fill huge demand. New easy Flok-Kraft methods. Material costs few pennies. You get dollars. Free samples, complete powerful money making plan free. Write now. Coast, 1002-L S. Los Angeles St., Los Angeles 15.

ACHIEVE business and financial success in your own Collection-Credit Agency business. Home or office. Quickly learned. Free folder. Write Cole & Associates, Syracuse 2, New York.

\$25 WEEKLY working two hours daily. No canvassing. No Manufacturing. Lycke, Box 2471-B, Cleveland 12, Ohio.

137 PLANS to make money local, mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

PEARL Finishing—New, Amazing—Huge Profits. Start Making Big Money first day. Free Facts show easy way to \$25 to \$50 per day at home. Absolutely no experience. Be first—scoop the market. Write Pearl-Kote, Dept. S, 2111 W. Manchester, Los Angeles 47, Calif.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

POPCORN poppers, peanut roasters, copper candy, caramelpop kettles. Northside Co., Indianola, Iowa.

USE Your Home as magazine subscription station. Represent all magazines. Liberal commissions. No experience—no capital needed. Catalog, full details free. Write McGregor Magazine Agency, Dept. 510B, Mount Morris, Ill.

START Mailorder Bookshop—Everything furnished. 25c brings booklet, samples, exciting ideas. General Publications, Ossining 1, New York.

\$124.50 WEEKLY Guaranteed! At home, sparetime, \$1.00 (deposit). Science Syndicate, San Antonio, Texas.

BE Appointed State Notary Public now! Details. Stationers, Helotes 50, Texas.

BUY Nylons direct from mill. Write for jobbers prices. Joy Hosiery Mills, Delawanna 14, New Jersey.

UNPAINTED Figurines. Beautiful models. Write for new wholesale price list. Oman, 642 S. Broadway, St. Paul 1, Minn.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway, 5713 Euclid, Cleveland 3, Ohio.

MAKE Money spare or full time casting Metal Toys and Novelties. Big wholesale and chain store demand for Autos, Soldiers, Ashtrays, Banks, etc. keeps manufacturers busy. Production moulds furnished for up to 100 and more castings per hour. No experience or special place necessary. "Cash-in" on holiday orders now being placed. Write for information and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N. Y.

MAKE Perfumes—Profitable Mail Order Business—Information free. "International", 6347 Parnell—PS-8, Chicago 21, Ill.

HOW To Set Up and Run A Mirror Shop! Resilver Mirrors. Make Chipped Glass Nameplates. Electroplating Salts and Rectifiers. John Sprinkle V90, Marion, Ind.

WIN Independence—Men, women make big \$\$\$ profits. Do fascinating home work. Hamilton, Box 45P, Woolsey Sta., Astoria 5, New York.

MAKE money making new greaseless doughnuts at home on electric machine. Wholesale to grocers, drug stores, cafes, hamburger shops. Send for free recipes and plans. S. Ray Company, 3605 South 15 Ave., Minneapolis 7, Minnesota.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "MINNESOTA"

LIQUID Rubber, make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

SLOT Machines, Punchboards, Wholesale Catalog. Webb Distributing Co., 4966 West Chicago Ave., Chicago 51, Ill.

REAL money making opportunity making Interlocking Concrete building blocks. Rex Products Co., Dept. 21, Piqua, Ohio.

ABSOLUTELY Free! Big package actual sample fabrics and style presentation of dresses, lingerie, hosiery, etc. Take orders. Commissions big. Send no money. Melville Co., Dept. 5626, Cincinnati 3, Ohio.

IMPORT-EXPORT! Men-Women. Learn from established World Trader. Your own profitable world-wide business by mail order from home without capital; or travel abroad. Experience unnecessary. Free details. Meilinger, A-1, Los Angeles 24.

OPERATE Profitable Mail Order Business. Repeat Orders. Successful "Beginner's" Plan. Everything Supplied. Lynn, 5710-C Bankfield, Culver City, California.

\$35 WEEKLY! Home! Two hours daily! Free! Walsh, 894 Main St., Buffalo 2, N. Y.

WASTE cans, sawdust; insulates homes;—saves 90%. Drawings—descriptions, \$1.00. Dowel Krafters, Route 2, Box 210-A, Hampton, Virginia.

DYNAMIC Sales Kit sells for you. Foto-Kolor Postcards, Sensational—New—Full-Color photo postcards; for manufacturers of toys, radios, autos, lamps, rugs, resorts, hotels, etc. Amazing low cost sells 9 out of 10. Terrific demand, earnings! Send 50c (refundable) for dynamic Sample Sales Kit—Details Free! Moss Photo Service, Dept. 100, 155 W. 46 St., N. Y. C. 19.

FABULOUS Earnings—Fascinating pastime. Growing Genuine living miniature (Ming) trees. New sensational Business or Hobby. Astounding information Free. Miniature Trees, Box 355, Briggs Station, Los Angeles 48 Calif.

SPARE time, \$50 up weekly selling top line personalized Xmas cards, stationery, etc. Samples free. Box ass'ts on approval Victory Studios, Mt. Vernon, N. Y.

MAKE flexible molds! Cast plaques, bookends, figurines! Free sample! H. Tooker, 630-A Chestnut, Hamilton, Ohio.

"DRUGGIST'S Guidebook!" Home use! Prescription Filling! \$1.00. Robins, 17-S, No. Pulaski, Chicago 24, Ill.

MAILING postcards selling repeat merchandise is profitable. Everything supplied. Details free. Gordon Publishers, Box 23, Pawtucket, R. I.

SENSATIONAL nylons guaranteed against runs. Nationally advertised. Not sold in stores. No experience or money needed. Also lingerie, robes, men's hosiery. Outfit, samples, etc. free. Wonderful opportunity earn big money spare or full time. See our full page advertisement on page 31. Kendex Corporation, Babylon 349, N. Y.

QUALITY molding latex \$2.25 Quart. Postage Extra. Free Model. Kendall, 108-L Central, Jersey City, N. J.

LIQUID Marble—Colorful, glossy! Molded. Brushed, sprayed! Cast Novelties. Statuary. Colored Tiles. Flexible Molds. Composition Floors. Particulars Free. Marbelling Service, Edwardsville, Ill.

YOUR own profitable home business. Preserve live flowers to last forever. Spare or full time. New discovery—simple—fascinating. No experience necessary. Send \$2.00 for working equipment, instructions and valuable sales plans. Satisfaction guaranteed or money refunded. Hermansen, 210 Fifth Ave., Suite 1102, New York 10, N. Y.

INVESTIGATION And cash liquidation—Old or recent stock certificates, bonds, bank books, promissory notes, deeds, wills, financial documents of every description. Send us your list for appraisal. National Evaluators, P.O. Box 5852, Cleveland 1, Ohio.

EXPORT-IMPORT offers trained men unlimited big paying Job Opportunities. Own Business. Independence, etc. FREE Facts Book. Write International Trades, 246-S, Fifth Ave., New York City 1.

MAKE Rubber stamps, metallize baby shoes, Repair dolls, silver mirrors, make plaster novelties. Catalog of "30 ideas" free! Universal, Box 1076-B, Peoria, Ill.

1/3 or 2/3 INTEREST in fast growing business (Incorporated) good turnover—new established. I want to retire, sell 1/3 for \$8,000. (Over \$60,000 year Volume.) P. O. Box 612, Olympia, Wash.

NATURAL Molding Latex. Extra thick. Free sample. W. Wooley, 115B Donald, Peoria, Ill.

MAGAZINES trade and class—help you get ahead. Latest copies. Nearly 1200 covering every business, trade, profession, sport, hobby or other interest available through our Easy-to-Get-Acquainted Service. Particulars and price-list Free. Commercial Engraving Publishing Co., 34S North Ritter, Indianapolis 19, Indiana.

FREE Illustrated course casting novelties. Genuine latex for molds. Major Chemical Co., 164 Portland St., Cambridge, Mass.

\$46 FROM Square Foot Plywood; Jigsaw necessary. Write: Woodart, Bridgewater, Massachusetts.

\$250 WEEK Reported! Free illustrated book "505 Odd Successful Businesses." Work home! Expect something odd! Pacific-E, Oceanside California.

NEW "Magic" Hand Cleaner. Fast seller-repeater. Money-maker! Free Sample. "Acro-Sol-Ex." 2438-D Fifteenth, Denver 11, Colorado.

BOOKKEEPERS earn \$100.00 week operating your "Bookkeeping Service". Simplified plan. Information free. Bookkeeping Service, Box 664-P, Springfield, Mo.

FREE Details! "The Magic Formula for Mailorder Success". Mailord Company, 204-A8 East 81, New York 28, N. Y.

MAKE-Sell Sensational New Product. 300% profit—no machinery—just add water. Everything supplied. National, Box 88-S, Boston 22, Mass.

MAKE Perfumes, at home, write, Carey Laboratories, 1914 Chouteau PS8, St. Louis 3, Missouri.

WANTED. Men to operate profitable electroplating and mirror shops—at home—part time or full time. We furnish electroplating equipment and training. Write Tyco Metals, Box 12008 A, Houston 17, Tex.

MAKE classy glass ornaments, new, nothing like them, cost 1/2 cent, large profits, huge market, dandy hobby. Samples, diagrams, instructions \$1.00. Hobby, 243 S. Lexington, St. Paul 5, Minn.

BUY Wholesale, Big-Name Items Up To 40% Below Retail. Folks Eagerly patronize you for big savings. Free Details. Young's, Kent 1, Ohio.

SPIN Angora wool into yarn. Interesting work. House of Angora, PSM6, Springfield, Illinois.

BETTER jobs in electroplating! Write Joseph Kusner Electroplating School, Stroudsburg 775, Pennsylvania.

SELL Specialty Cookware, Vitamins, Nutritional Appliances, National Products, Portland 2, Oregon.

MAIL selling opportunities galore! Free! Wehner, Box 142-E2, Roxbury 19, Mass.

EYEGLASSES \$10.00; Bifocals \$12.50; Tester \$1.00. Dioptrico, 911-W California, Oklahoma City 4.

WHERE To buy 50,000 articles wholesale. Details free. Krueger, 3418S Wolcott, Chicago 13, Illinois.

\$4,000.00 PROFIT in two months. No investment. Details 50c. Charles Co., 12-BPA, Norwood, Ohio.

FAMOUS Gar Wood boat designs simplified for home building. Inboards—Outboards—Racers. Send 25c for catalog and boat building booklet. Gar Wood, Jr., Box 4373, Miami Beach 41, Florida.

CARD—Novelty Salesmen. New novelty postcards. Fast seller—Samples Free. Bella Vista, Mitchell, Illinois.

EASY To Make Expensive perfume with low cost "Essential Concentrate Base" Fast Tremendous Profits Write Post Card—H. May, Box 4473-C, Coral Gables 34, Fla.

900% SELLING "Silver Detarnishing Plates". 508-PS8 NY, Street, Aurora, Ill.

REGRAIN—Refinish Automobile Dashes—Mouldings—Furniture. Big Profits. Write Outman, 4323 South 38th St., St. Louis 16, Missouri.

GOT an idea? Let "Ideas unlimited". Warrington Post Office Fla., review it for practicability and marketability. Enclose \$1.00. All correspondence confidential.

LEARN engraving, carving Plexiglas. Lucite plastics with "Pantograver" new hand motor tool and flexible handpiece, pantograph attachment. Details, sample engraving 25c. Desco Products Distr's., 6334-J Sepulveda, Van Nuys, Calif.

LEARN the profitable and fascinating art of Electroplating Baby Shoes at our expense! Write for details to manufacturers of world's largest assortment all metal mounts, equipment and supplies. Dept. W2, Hollywood Bronze Supply, 6141 So. Wentworth Ave., Chicago 21, Illinois or 1766-70 N. Vermont Ave., Hollywood 27, California.

BRONZED Baby Shoe Mountings, equipment and supplies. Buy wholesale from world's oldest and largest manufacturers of all metal mountings. Sales Dept., Hollywood Bronze Supply, 6141 So. Wentworth Ave., Chicago 21, Illinois or 1766-70 N. Vermont Ave., Hollywood 27, California.

57 MONEY MAKING OPPORTUNITIES

RAISE your business value, standing, as State Notary Public. Information, Stationers, Helotes 50, Texas.

LEARN Sewing Machine Repairing at home. Earn \$125.00 week spare time. Plus, new machines, motors, etc. Wholesale. Free Particulars, Taylor Service Co., Hamilton, Ohio.

EXCELLENT profits. Make fast-selling chenille Christmas poinsettias, corsages, Santas, monkey trees, dolls. Literature free. Velva, Dept. X, Bohemia, N. Y.

VENDING Machines. Punchboards. Free Catalog. Tyrcha Wholesale, 4532 N. Meade Avenue, Chicago 30, Ill.

INDEPENDENT income! Make leather belts, billfolds, purses. Big catalog and genuine steerhide keyholder, 10c. Tandy Leather, Box 397G, Tulsa, Okla.

DETECTIVES Earn Big Money. Experience unnecessary. Detective Particulars free. Wagoner, P-125 West 86th, N. Y. 24.

DISTRIBUTE Sensational Songwriter Booklet, "Commercial Music." Ideal Home Mail-Order Business—Publication—Details—Discounts—\$1.00—Popular—Box 927—Atlanta, Georgia.

\$250 WEEK Reported! Free illustrated book "505 Odd Successful Businesses." Work home! Expect something odd! Pacific-E, Oceanside, California.

ADDRESS mail circulars for advertisers. Complete instructions—List of firms—25c Imperial, PS-8, Wilmington, N. Car.

NEW Patented. Hobby-horse. It walks. It rocks, exclusive territory Manufacturing rights. Free details. Carl Markowski, Lewiston, Idaho.

RUN Low Cost Ads—Mail Postcards offering books, merchandise, Big Profits. Everything supplied. Write: National, Box 88-G, Boston 22, Massachusetts.

A \$100-A-Month hobby at home! No soliciting, no mail order, no meeting people. Easy enjoyable pastime. Details, 25c (Refundable). Laura Dickson, 1006-PS Elizabeth Street, Anderson, S. C.

EARN Money Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

EARN \$2.00 to \$3.00 an hour. No selling or manufacturing. Details \$1.00. Harris, Box 522, Decatur, Illinois.

58 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

FREE formula catalog anything analyzed \$20.00. Western Chemical, Salem, Oregon.

LABORATORY tested formulas. Lists free. Pont, Box 635-PS, Terre Haute, Ind.

59 PLASTICS

PLASTIC supplies, materials, instructions for hobby or business. Send for free catalog. Tells about internal carving. Hays Plastics, 1310 82nd Ave., Oakland, Calif.

LUCITE. Plexiglas. Any size sheets, masked Square foot (12 x 12) cost 1/16". 96c; 1/8", \$1.25; 3/16", \$1.52; 1/4", \$1.80. Colors add 10%. Include 10% postage. Almac Plastics, 230 Fifth Avenue, New York 1, New York.

NEW Liquid plastic, Clear, colors. Cast without heat. Embed flowers, insects, coins. Saw, drill, carve. Send 25c for exciting new home project manual showing how to get started. Castolite, Dept. J-102, Woodstock, Illinois.

PLASTIC Sheets, Rods, Tubes, etc. Free List. Plastic Supply Co., 2901 N. Grand Blvd., St. Louis 7, Mo.

INTERNAL Carvers—Plastic domes; Spherical-faced blanks—Free Price List. D. Niehaus, 6754 Vernon, University City, Missouri.

LUCITE. plexiglas. Acetate. 85 different colors, thicknesses. Immediate shipment from stock. Rod, Tube, casting plastic. Wholesale, retail. Catalog, instructions, bargain lists, 10c. Gem-O-Lite, Box 686Y, North Hollywood, Calif.

PLASTIC Sheets (Air Force Surplus) 19" x 23". Many uses. 3 for \$2.00. Sterling, 511 N. Ashland, Chicago 22, Ill.

60 CHEMICALS AND APPARATUS

NEW Idea Chemical and Apparatus Outfits for Home Experimenting. Photo-Scales, Microscopes, Chemicals, Biological and Laboratory Supplies in Small Quantities. Catalog 15c. Established 1931. John H. Winn, 124-B West 23rd Street, New York 11, N. Y.

LUMINOUS Paints will glow in dark. Six colors. Fairmount Chemical Co., 136 Liberty St., New York City 6.

COMBINATION Offer—Chemical balance, litmus paper, spoon, catalog of chemicals, apparatus, kits, \$1.00. Catalog only, 25c. Rex Laboratories, 2849-B Birchwood, Chicago 45, Illinois.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology, 10c. Tracey Laboratories, Evanston, Illinois.

CHEMICALS and apparatus for industrial, analytical, and private laboratories. Catalog 15c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N.Y.

LABORATORY chemicals and apparatus. New catalogue 10c. Luther Laboratories, New Britain, Connecticut.

OH Boy! New Book of Science, Experiments, Formulas, Secret Processes, together with Catalogue of Laboratory Supplies, Only 25c. National Scientific Company, 2204 W. North Ave., Chicago 47, Ill.

SNOOPERSCOPE book \$1.50. Infrared catalogue 10c. Precise, 943 Kings Highway, Brooklyn 23, New York.

61 HELP WANTED

INTERESTED in Latin American & Foreign Employment????? \$1.00 brings 1950 Copyrighted "Foreign Service Directory" World Wide Listings in Constructions; Oil Mining; Aviation; Steamships; Manufacturers; Transportation; Exporters, Importers. Hot List Firms Hiring. How-When-Where to apply. Application form free. Global Reports, P. O. Box 883-S, Hollywood 28, Calif.

ALASKA—Last Great American Frontier. \$1.00 brings 1950 Copyrighted Directory & Government Map Free. Big Construction Projects; Fishing; Mining; Aviation; Hunting-Fishing-Game rules; Fur-Farming; Lumber; Live Stock; Agriculture, Homestead Land & Highway information. Listing firms hiring. Application form. Alaska Opportunist, P. O. Box 883-S, Hollywood 28, Calif.

\$1,000,000 CONSTRUCTION job-Project Report. \$1.00 brings Monthly News Bulletin giving authentic projects starting "World Wide" USA; Alaska; Canada; Pacific; Arabia; Latin America; India; Mexico; Africa; Europe. Tells How-When-Where to apply. Global Reports, P. O. Box 883-PX, Hollywood 28, Calif.

FOREIGN Employment. Construction men, building trades, mechanics, helpers, office men. Good workers interested in Foreign Development Projects. Pipe lines, Dams, Power Plants, Roadways, Shipping, Oil refineries, etc. Transportation and quarters furnished. High wages. Listings of firms actively working on projects in Arabia, Persian Gulf, Africa, Alaska, Canada, South America, Europe, etc. Send \$1.00 for Foreign Construction Compendium and Application forms. Foreign Service Bureau, Dept. PS-8 (Employment) P.O. Box 295, Metuchen, N. J.

62 AGENTS WANTED

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Letter Co., 437 N. Clark, Chicago.

FAST profits—No investment. Send for big, free catalog. Plastic aprons, tablecloths, etc. 150 sure-fire items. We guarantee sales. Write The Halliday Company, Dept. P-6, 15-19 Pennington Ave., Passaic, N. J.

PHOTO-Salesmen-Agents. Sell beautiful hand-colored plastic enlargements. Collect deposit, we deliver. Profitable sideline. Send card for free sample kit. Novel Portrait Co., 3343-A North Ave., Chicago, Ill.

EXCELLENT Sideline for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also, make money with our line of Automobile Initials and Sign Letters. Free Samples. "Ralco", XL-Roxbury, Boston 19, Mass.

CASH in on tremendous demand for new low priced burglar alarm for cars, homes and farm building. Nothing like it. Everybody wants one. 286% profit. Unique sample offer. Northwest Electric Co., Dept. H-20, Pukwana, S. Dak.

START Your Own Business on Credit. Always your own boss. 1554 Dealers, sold \$5,000 to \$26,500 in 1948; their average \$6,742. We supply stocks, equipment on credit. 200 home necessities. Sales experience not needed to start. Wonderful opportunity to own pleasant, profitable business backed by world-wide industry. Write Rawleigh Co., Dept. H-U-PSC, Freeport, Ill.

CALL ON FRIENDS with sensational Christmas Cards in handy assortments. Sell for \$1.00. Profit up to 50c. Also popular-priced Personal Christmas Cards. Everyday assortments. Stationery. Gift Items. Samples on approval. Wallace Brown, Dept. N-4, New York 10, N. Y.

WHERE To Buy 800,000 articles direct from Manufacturers. Save by buying direct. Sent Free. "Your Profits Under the Spotlight." Glass Pub. Co., Ellwood City 3, Pennsylvania.

DRESSES 18c; Coats \$1.00; Blouses 35c; Free Catalog; Crown, 164-PB, Monroe St., New York 2.

BE Renewal Headquarters for all magazines. Handle everything at home. Big profits. No experience—no capital needed. Free catalog tells how. Write McGregor Magazine Agency, Dept. 510A, Mount Morris, Illinois.

GOOD Paying Business Silvering mirrors, plating autoproducts, reflectors, bicycles, bathroom fixtures, etc., by late method. No tanks or shop required. outfit furnished. Free Booklet, Gunmetal Co., Ave. C, Decatur, Illinois.

FREE Outfit! Write today! Sell Embroidered Advertising Uniforms and Work Clothes. Initial Buckles, Belts, Badges. 2000 Emblems. Hookfast Co., Box 480PS, Roanoke, Virginia.

DRAW side income under Notary Public appointment. Stationers, Helotes 50, Texas.

SHINE Shoes Without "Polish." New Invention. Lightning seller. Shoes gleam like mirror. Samples sent on trial. Kristee 152, Akron, Ohio.

FREE SAMPLES. Big profits showing amazing Glow-in-the-Dark specialties. House numbers, pictures, plastic novelties, ashtrays, keyholders, religious and nursery objects, etc. Madison Plastics, 303 Fourth Ave., New York 10, N. Y.

AT LAST! Something new and sensational in Christmas cards. Show gorgeous satins, velours and metallics never before offered. Gets easy orders fast! Pays up to 100% cash profit. Free Samples of 30 Christmas cards with name, 50 for \$1.00 up. 80 Assortments. Personalized Book Matches and Stationery. Gift Items. 2 assortments on approval. Write Puro Co., 2801 Locust, Dept. 041-K, St. Louis, Mo.

EXCEPTIONAL earnings selling famous Bostonian Shirts. Spare time, full time, sideline. Sales kit, actual fabrics. Free. Bostonian, 89 Bickford, Dept. A-11, Boston 30, Massachusetts.

FREE Samples, and amazing plan, giving you Gorgeous Dress without penny cost. Rush name today with dress size. Harford, Dept. C-235, Cincinnati 25, Ohio.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-850, 7530 Greenwood, Chicago.

ANYONE can sell Hoover DuPont Nylon Uniforms for beauty shops, waitresses, doctors, nurses, others. In white and colors. Exclusive styles. Top quality. Low priced. Exceptional income. Real future. Equipment free. Write fully. Hoover, Dept. G-101, New York 11, N. Y.

\$50 YOURS sell only 100 boxes beautiful Xmas cards; also 50 & 25 for \$1 imprinted; others; novelties, metallics; stationery, write now for approval samples, cost nothing to try. Pen-'n Brush, PS-8, 139 Duane St., New York City 13.

1950 XMAS Card catalog ready! Earn more money as a wholesale jobber! Large selection of dollar box assortments. Imprints. Religious. Personalized Christmas Cards! Three dollar sample boxes \$1. Postpaid! Write for FREE Holiday Bulletin. Elfko, 438 North Wells, Chicago 10.

COMMERCIAL Deep Frying Course. Mock Chicken Legs, Potatoes. New and proven methods. Learn about this money-making field. \$2.50. PP. Concession, Toledo 13, Ohio.

GOLD lacquered Window Sign Letters. Large Sizes Penny Each. New foils. Absolutely Beautiful. Free Samples. Atlas, 544 W. 79th, Chicago 20.

SELL Ultra-blue stock signs to stores. 1000 slogans, comedy, general religious, 7" x 11" cost 6c, sells 35c. Make money. 15 samples \$1.00 postpaid. Lowy, 812 Broadway, Dept. 560, New York.

MAKE money for yourself or organization. Sell big value Christmas. Everyday assortments. Wrappings. Stationery. Gifts. Deluxe Personals to friends, others. 100 items. Amazing profit. No experience necessary. Special Offers. Extra cash bonus plan. Write today for samples on approval and exciting details. Hedenkamp, 361 Broadway, Dept. PS-8, New York.

IMAGINE—extra cash for you! Sell friends amazing value Metallic. Felt Applique, Comic. 50 for \$1.00 Christmas Cards. Exclusive Gift Wraps. All-Occasion Assortments. Scented Stationery. Animated Books. Gifts. Profits to 100%. Special offers. Bonus. Write today for free samples Name Imprinted Christmas Cards, Napkins, Stationery. Feature assortments on approval and free catalog. Elmira Greeting Card Co., C-2210 Elmira, N. Y.

NEW Jobs open in selling! Send name, address for five free issues of Opportunity Magazine's money-making guide, listing hundreds of companies who'll pay you well, full or part-time. No experience needed. Opportunity, 28 E. Jackson, Dept. 18, Chicago 4, Illinois.

JUST out! New Thrilling Sensation in Christmas Cards. Make big money! Show Lustre Fells, Satins, Brilliants. Amazing values bring easy orders! Christmas Cards with Name 50 for \$1 up. Also Imprinted Book Matches. Stationery. Many Gifts. Get 30 Free Samples with name; two \$1 Boxes on Approval. Joy Greetings, 507 N. Cardinal, Dept. B-61, St. Louis 3, Mo.

\$50 CASH! Sell America's Leading 21 Card Christmas Assortments. Samples on approval. New Sensational Money-making Gift Items. Free samples 50 and 25 for \$1.00. Personal Christmas Cards. Write Lorain Art Studios, Dept. 68, Vermilion, O.

RAISE money for yourself, your club or church. Sell friends Metallic Christmas Cards, Wrappings, Children's Books, Gifts. Novelties. Big profits. Bonus. Request Feature samples on approval. Free samples Name Imprinted Christmas Cards. Stationery. Napkins. free Catalog and free Selling Guide. New England Art Publishers, North Abington 255, Mass.

NEED extra dollars? Even beginners make profits to 100% selling new "Christmas Pearls". Metallics, Hankie assortments. Big line Novelties, Kiddies' Books, Wrappings. Bonus. Free sample portfolios Name Imprinted Christmas Cards. Stationery—50 for \$1.00 up. Feature boxes on approval. Write Pilgrim Greetings, 111 Summer, Dept. AO-5, Boston, Mass.

AMAZING offer—\$40 is yours for selling only 50 boxes Christmas cards. And this can be done in a single day. Free samples. Other leading boxes on approval. Many surprise items. No experience needed. Free samples personalized Christmas cards, stationery, napkins. Write today. It costs nothing to try. Cheerful Card Co., 1548 White Plains, N. Y.

\$1 STARTS you in business. Sell fine \$1 ties. \$1.50 and up values only \$7.20 dozen. you make \$4.80. Send only \$1 for 2 sample ties. Catalog free. Philip's Neckwear, Dept. P-43, 20 West 22nd Street, New York 10.

SELL Swiss wrist watches 14K gold-plated case-band unit; rhinestone dial. Sensational \$15 retailer. Send for information & sample \$6 C.O.D. Money back guarantee. Dept. P5, Dunhall Imports, 101 Cedar St., New York City.

50.00 EASILY made in spare time. Sell sensational new name-imprinted Christmas Cards. 50 sell for only 1.00. Not obtainable elsewhere. Big Profit. Write for free samples. Kit on approval. Regal Greetings, Hazel Park 49, Michigan.

NEW Bathroom Deodorizer. Hangs on wall. Banishes odors bathroom, kitchen. Lightning seller. Samples sent on trial. Kristee 153, Akron, Ohio.

AMAZING 1950 personalized 50 for \$1.00 Christmas Cards. Every day cards. Stationery. Napkins. Dolls. Other Wonderful values. Samples on approval. Plateless. 392 Broadway, New York.

JEWELRY For Salesmen Distributors Direct Factory. Catalog Free. Pickcraft (c 19) Bank St., Attleboro, Mass.

FAST selling profitable novelties. Complete information. Halo, 1020, Harrisburg, Pennsylvania.

SENSATIONAL nylons guaranteed against runs. Nationally advertised. Not sold in stores. No experience or money needed. Also lingerie, robes, men's hosiery. Outfit, sample, etc. free. Wonderful opportunity earn big money spare or full time. See our full page advertisement on page 31. Kindex Corporation, Babylon 349, N. Y.

SHARE in 300 million dollar business. Necessary dietary food supplements assures agents large, steady income. Important, different proposition free. Rush name. Vitmore Co. (PS), Box 470, Glendale, Calif.

SELL Big Money-Maker to men and Women. Easy handwork makes fast-selling useful articles. Sample free. Sunmade Company. Brockton 64, Mass.

BIG Bargains for big profits. Over 100 sensational values. Men's used suits \$2, pants 35c, topcoats \$1.25, overcoats \$2, shoes 20c. Experience unnecessary. Free wholesale catalog. Superior, 1250-B Jefferson, Chicago.

COSTS 4c—Sells Fast for \$1. Information Free. Pacific Sales, Box 1458-B, Wenatchee, Washington.

SELL \$2 Fire Extinguishers, locally, mailorder. Lorrac Products, Box 1086, Albany 1, N. Y.

CASH in on amazing profits. Sell hammer-screwdriver combinations to homes, hardware stores, service stations, etc. Also many other items. Samples furnished. Brocker Manufacturing Company, York 4, Pa.

SELL!! Balloons, Combs, Specialty Merchandise, Carleton House Distributors, Texas City, Texas.

\$250 WEEK reported! Free illustrated book "505 Odd, Successful Businesses." Work home! Expect something odd! Pacific-E, Oceanside, California.

NEW "Magic" Hand Cleaner. Fast seller-repeater. Money-maker! Free sample. "A-S-E," 2438-D Fifteenth, Denver 11, Colorado.

HOUSE Paint—Sell users and stores. Private label. Steady work. Big pay. Certified Products, Louisville, Ky.

FREE Literature—Thousands Wholesale supply sources. Moneymaking Business ideas. Wilkin Company, Hillsboro 2, Ohio.

POWER Mowers—\$59.50. Delivered. 15-Day Approval. World's Cheapest. Modern-BG, Excelsior Springs, Missouri.

DISTRICT Agency. Power Mowers—\$59.50 up. 5 models. Appoint dealers. Write fully. Rotacut, R-2008, Excelsior Springs, Missouri.

NEWEST money making sensation. Sell personal initialed belts, buckles, cap and breast badges, tie holders, etc. Choice 2000 emblems. Write Special Outfit Offer today. Hook-Fast, Box 1425PS, Providence, Rhode Island.

FREE Catalog—Fast-Selling Household Items. Big daily earnings—full, spare time. National, Box 88-S, Dorchester 22, Mass.

GET 'Em While They're Hot. Newest products, surplus goods, mfrs. sellouts. Brand new red-hot money makers. Tremendous profits. Rush 25c for latest monthly issue Buyers' Bulletin listing lowest wholesale sources. It will amaze you. National, 2014 Broadway, Dept. PS-1, Indianapolis 2, Indiana.

BUY thousands of nationally advertised products direct from manufacturers and distributors. Write for "Buy Direct and Save." Service Publishing, 1420-B Investment Bldg., Pittsburgh 22, Pa.

PAST sellers. Big demand. Catalog. Parker Drug Co., Hoboken 6, N. J.

FREE Handbook. build sawmills, block machines, freezers, tractors, scooters. 250 shop, farm, home machines. Nichols Co., Dept. C-1002, Purvis, Miss.

\$85 WEEKLY selling 4 pair shoes daily direct Free outfit. Samples. No investment. Experience unnecessary. Advance commissions, bonus. Paragon Shoes, 738 Columbus, Boston, Mass.

FISHERMAN'S "Water-Depth Measuring-Gauge." 508-PS8 NY, St., Aurora, Ill.

SELL America's only \$1.00 Gift wrap assortment containing 30 full size sheets; Giant plastic pencil containing personalized pencils; Santa stocking with name; Rudolph, the red nosed reindeer assortment. Over 100 Christmas card box assortments and surprise items. Write today for five—Free portfolios of personalized Christmas Cards. Elmercraft, Dept. 17, 5930 S. Western, Chicago 36.

EARN \$50 A Day Selling \$6 men's welt hand laced loafers. Write BenJoe Shoe Co., 117 Clifton Ave., Clifton, Mass.

63 HIGHGRADE SALESMEN

WRITE 3 Words—Collect \$7.65 on 10-Second Demonstration to merchants—write on glass with Amazing Magic Crayon—Presto!—5 color advertising message takes fire—glows like brilliant Neon. Three sales daily bring \$22.95 profit. Rush postcard for details.—Complete Sales Kit. Free! Maxilume Co., 125 W. Hubbard, Dept. CL-9, Chicago 10, Illinois.

60 POPULAR SCIENCE

BIG Money Taking Orders: Shirts, Ties, Sox, Pants, Jackets, Sweaters, Shoes, Uniforms, etc. Sales equipment free. Experience unnecessary. Nimrod, 4922-AV Lincoln, Chicago.

LOOK Here! Wanted—Men and women to start in business on credit. Sell some 200 farm-home Products. Thousands our Dealers now make quick sales, big profits. For particulars write Rawleigh's, Dept. G-192-PSC, Freeport, Illinois.

SALESMEN—Sideline. Earn \$3,000 next 5 months selling calendars, advertising specialties. Buyers Everywhere. Big Commissions advanced. Samples Free. Continental Calendar, 542-B South Dearborn, Chicago.

SENSATIONAL Nylons guaranteed against runs. Nationally advertised. Not sold in stores. No experience or money needed. Also lingerie, robes, men's hosiery. Outfit, samples, etc. Free. Wonderful opportunity earn big money spare or full time. See our full page advertisement on page 31. Kendex Corporation, Babylon 349, N.Y.

SALESMEN—Put yourself in line for big money, real future. Keep stores supplied with 5c-10c to \$1 counter goods. Nationally advertised. Top profits for you and merchants. Liberal deals boost sales. Sideline or full time. World's Products, Dept. 83-J, Spencer, Ind.

MAKE \$100 one sale. One call. Sideline or full time. Dignified, pleasant position as registrar for nationally known school. Write fully. Registrar's Office, Station V, Box 2136, Los Angeles.

SALESMEN. Earn \$50.00 weekly, selling only three pairs shoes daily. Commission and bonus. Wide variety for men, women, children. No investment. Experience unnecessary. Free catalog. Tanners Shoes, 666 Boston, Mass.

WE want distributors. New paint remover line, protected territory. Small investment required. Write Meridian Laboratories, P.O. Box 32, Rockford, Illinois.

WANTED: Man who needs to earn at least \$75 weekly. Must be willing to work eight hours a day. National organization. Permanent. Write Red Comet, Inc., Department 696, Littleton, Colorado.

67 EDUCATIONAL AND INSTRUCTION

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought). Lee Mountain, Pisgah, Alabama.

BE A real estate broker through home study or classroom instruction. Write for free book. Approved for veterans. Weaver School of Real Estate, 15 E. Pershing Rd., Box PC-11, Kansas City 8, Mo.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203, Cedar Grove, North Carolina.

WANT a steady Big Pay Job in Diesel? Our approved, easy-to-understand Diesel Training Course qualifies you. Placement advisory service Free. Learn as you earn. Write for free 24 page book today! Interstate Training Service, Dept. 2N, Portland 13, Oregon.

LEARN Piano Tuning, Repairing—at home in 30 days. Unlimited income. Phonograph recordings, tools and instructions furnished. Write Capitol City Tuning School, Department C-833, 129 East Michigan, Lansing 16, Michigan.

PIANO Tuning Pays. Learn this profitable profession at home. Our Tonometer and mechanical aids make learning easy. No knowledge music necessary. Diploma granted. Largest and oldest school—51st year. G. I. Approved. Write for booklet. Niles Bryant School, 77 Bryant Bldg., Washington 16, D. C.

MAKE Up To \$35-\$45 Week as a Trained Practical Nurse! Learn quickly at home. Booklet free. Chicago School of Nursing, Dept. M-8, Chicago.

LEATHER Carving. Fascinating, highly-paid art; age-old secrets now taught for first time in home study course. For hobby, profession or profitable business, write: Baird School of Leather Carving, Dept. 28 Manitou Springs, Colo.

SEE our collection-credit business ad under Business Opportunities. Cole & Associates, Syracuse, N. Y.

LEARN Gunsmithing! Details, copy "Guns and Gunsmithing." 25c. Gunsmith's Supply, Palatine 6, Illinois.

IT'S Later Than You Think! G.I. training will soon be over. Inquire about training for job opportunities to make your future secure. Don't risk losing your veteran's entitlement. Factual information free. Write Box A4292, W.P.H.I., Chamber of Commerce Building, Pittsburgh 19, Pa.

REACH an untapped source of profitable new business in chronograph watch repair. Easy step-by-step Essembl-O-Graf method taught in GI-approved 22 week resident course or by low-cost home study plan. Be the first in your community to display the handsome Certified Chronograph Technicians' diploma. Complete information on request. Western Pennsylvania Horological Institute, Desk A-92, 706 Smithfield Street, Pittsburgh, Pa.

BECOME a Doctor of Psychology or Metaphysics. Teach secret of contentment, happiness. Win degree of PsD. or MsD. Solve mental worries. Free book. College of Universal Truth, 5153-K N. Clark, Chicago.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

YOU For President of Your Own Credit-Collection business. Many who answered our ads now have their names on office doors. Franklin Credit, Roanoke 7, Va.

DENTAL Technician's Manual. Authentic. Direct information. Write for free illustrations. Grant Laboratory, 219 W. 7th St., Los Angeles 14, Calif.

U. S. GOV'T Jobs! Start high as \$66.34 week. Men—Women. Qualify Now. Thousands of openings despite economy efforts. Experience usually unnecessary. Free 40-page book shows jobs, salaries, sample tests. Write: Franklin Institute, Dept. H-22, Rochester, New York.

AMAZING new scientific way to remember. Free details. H. Kaye, P. O. Box 261, Staten Island 1, New York.

REVOLUTIONARY conception of Public Bookkeeping! \$5.00 hourly. Simple instructions. Full, spare time. Systems, shortcuts, obtaining clients. Auditax, 10775-L, Tabor, Los Angeles 34.

GET photographic mind with Super-memory. Write Thor Books, S-8 Box 1210, Chicago.

DRAFTING. Design, Mathematics, Building Estimating, Surveying, Engineer's License Preparation. Veterans accepted. Mondell Institute, 230 West 41st, New York.

GUNSMITHING—learn for profit, pleasure! Practical Residence Course, day or eve; G.I. approved. Limited enrollment. Facts free! Pennsylvania Gunsmith School, 423 Federal, Pittsburgh.

READ With Speed! New Amazing Method. Save hundreds of hours yearly. Free home test. No obligation. Rush postcard. Brownson, 9111 Hoyne, Chicago 20.

HOME Study Courses. Chiro-Deo-Therapy, Drugless Healing Certificates. Diplomas, Degrees. Western University, Inc., Jacumba Hot Springs, Jacumba, Calif.

70 LANGUAGE OUTFITS

IT'S Fun Learning a Language by Linguaphone. At home, in leisure time, quickly, easily, correctly master Spanish, French, Italian—any one of 29 languages through proved Linguaphone conversational method. Send for free book. Linguaphone Institute, 54-M Radio City, N.Y.C.

LANGUAGE Outfits Teach yourself French, Spanish, German, Italian quickly, easily at home. Simplified, tested courses, complete 50c each. Give language choice. R. Fisher, 240 West 16th Street, New York.

72 AUTHORS SERVICE

I WANT New Writers to cash checks of \$1 to \$100 offered daily. The easiest way to write for pay. No previous experience necessary. Free Details. Saunders M. Cummings, 468-15 Independence Bldg., Colorado Springs, Colo.

73 BUSINESS SERVICE

WHERE to buy it information, almost anything. Write, listing items. Kelly, 9544-C Whitcomb, Detroit 27, Michigan.

CHICAGO Mail Address. Business or Personal. Faultless—S 3439 Michigan, Chicago.

74 CARTOONING, SIGN PAINTING, DRAWING AIDS

SIGN painting taught at home. Test lesson free. Ben Kerns, Box 812-PS, Greenville, S. C.

"HOW TO MAKE MONEY WITH SIMPLE CARTOONS"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 198-C, Pleasant Hill, Ohio.

CARTOON Your Way To Success! Internationally known instructor, Raye Burns, will personally teach you to create salable, original cartoons at home. Course of 26 lessons only \$2.85. Send remittance with order or write for Free Details and addresses of successful students. Raye Burns School, Box 3583-S, Cleveland 18, Ohio.

75 CHALK TALK-STUNTS

CHALK Talks. Laugh Producing Program. \$1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

76 TYPEWRITERS AND OFFICE MACHINES

PRINTOMATIC selffeeding Post Card printing Duplicator \$13.50. Envelope Addressing Machines \$24.50. Pittsburgh Typewriter Company, 336-G Fourth Avenue, Pittsburgh 22, Pa.

77 OFFICE SUPPLIES & EQUIPMENT

REVOLUTIONARY Portable Addresser. No Plates! New Sensational!! Only \$9.95 Complete!!! Fully Guaranteed. Prub-Ex, Kingsport, Tennessee.

NEW Adders \$12.50, duplicators \$9.95; addressers \$9.95; Typewriters, 118N Spruce, Wichita, Kansas.

78 RUBBER STAMPS

DELUXE Cushioned; Knob Handle, three lines 50c, 4-60c, Ink Pads 40c. Folder Free. Warner Stationery, 351 Green, Havre de Grace, Maryland.

3 LINES 50c; Pads 35c; Signature \$2. Print-Right, Wauwatosa, Wis.

79 PRINTING OUTFITS, SUPPLIES

PRINTING Presses, Type Supplies, Lists 3c. Turnbaugh Service, Loysville, Penna.

BARGAINS Printing Supplies. Specimens 5c. La Garza, 98 Pleasant, Cambridge 39, Massachusetts.

MAKE Your Own rubber printing cuts. Self-molding process. Plexirubber, Argyle 2, Wisconsin.

PRINT your own cards, stationery, circulars, advertising. Save money. Simple rules. Print for others, nice profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, L-8, Meriden, Conn.

80 PRINTING, MULTIGRAPHING, ETC.

1000 BUSINESS Cards \$2.50. Prenaïd samples Free. Reliable Print Shop, 905 East Jefferson, Louisville 6, Ky.

ATTRACTIVELY Embossed Business Cards, 1000; \$3.50. Samples, Midwest Embossing, Box 999A, Wichita 1, Kansas.

BUSINESS Printing, Samples, Prices Free. Howprint, 717-23 Eunice, Webster Groves 19, Missouri.

82 PATENT ATTORNEYS

INVENTORS. For "Record of Invention" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John N. Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 939 Columbian Bldg., Washington 1, D. C.

INVENTOR'S Guide free on request. Frank Ledermann, Registered Patent Attorney, 154 Nassau St., New York 7.

INVENTORS: Write for free brochure "Evidence of Invention." Labiner, World Building, New York 7.

PETER Fries, Jr., Registered Patent Attorney, Patents, Designs, Novelty Searches, Copyrights, 110 East 42nd Street, New York City.

PATENT practice before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 413, 815-15th St. N.W., Washington 5, D. C.

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 62B-G, District National Building, Washington, D. C.

REGISTERED Patent Attorney offers services. Sanders, 6430 Evans, Chicago 37, Illinois.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 541-J Merlin Building, Washington 6, D. C.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorro, Berman & Davidson, Registered Patent Attorneys, 1434 Victor Building, Washington 1, D. C.

C. A. Snow & Co., S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

PATENTS—Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

83 FOR INVENTORS

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 205 Columbian Bldg., Washington 1, D. C.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

INVENTORS: The usual First Step is to have a search of the U.S. Patents conducted, so I can report on Patentability. Write, without obligation. Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 939 Columbian Bldg., Washington (1), D. C.

INVENTORS: If you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 631-E St., N.W., Washington 6, D. C.

"INVENTOR'S Guide" free on request. Frank Ledermann, Registered Patent Attorney, 154 Nassau St., New York 7.

INVENTORS. For "Record of Invention" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 62A-G District National Building, Washington, D. C.

INVENTORS—Send today for booklet "Patent Protection for Inventors" giving detailed patent information and preliminary steps to take toward patent protection, also "Evidence of Invention" form. Victor J. Evans & Co., 542-J Merlin Building, Washington 6, D. C.

SUCCESS Guaranteed. Inventors with patented and patent pending inventions for sale or lease, request our free book. No obligation. Dept. 2-F, Universal Marketing Co., 354 South Spring St. Los Angeles 13, Calif.

INVENTORS—If you believe you have an invention, we can make a preliminary search on your invention and advise you whether we think it can be patented. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorro, Berman & Davidson, Registered Patent Attorneys, 1433 Victor Building, Washington 1, D. C.

COMPREHENSIVE inventors services by patent research organization: Patent searches, patent drawings, patent applications prepared invention marketing, protection forms free. Industrial Patent Reports, Box 1061, Massachusetts and North Capitol, Washington 13, D. C.

PATENT Searches by former Patent Office Examiners \$5.00. Protection forms free. Write Patent Examiners, 734 15th Street, N. W., Washington 5, D. C.

INVENTORS! Save hundreds of dollars in patent fees, brokers' commissions and promoters rake-offs. Amazing self-teaching invention-drawing and patent-preparing kit shows how you can make magnificent 3-dimensional "pictorial models" of your ideas—fast. No instruments needed, just use pencil. Improve and perfect your ideas with this almost automatic kit designed by a prominent patent attorney-inventor. Write your own patent specifications. Skill absolutely unnecessary. Price \$1.75. Also 70-page guidebook "How to Win Sales And Make Better Inventions" describing how to protect and promote your invention before you patent it; how to give it that streamlined look that spells sales-leadership, coin snappy, money making trademarks and slogans. Get this door-opener to inventive success, and learn all about the 39 brand-new ways in which I.F.I. gives power to modern men of ideas. Price \$2.00. Or both together with three exclusive, I.F.I. secret self-registering records of invention, (85c if purchased alone), and other valuable literature, complete, for only \$3.75, and we'll airmail your money back if you don't say the package is worth many times the price. Order now, from Inventors-For-Industry Inc., Desk PS8, Suite 501, 1947 Broadway, New York 23, New York.

84 INVENTIONS WANTED

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

INVENTIONS Promoted, Patented or Unpatented. Write Adam Fisher Company, 163-A Enright, St. Louis, Mo.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information, free. Institute of American Inventors, Dept. 30C, 631-E Street, N.W., Washington 4, D. C.

HIGHEST royalties—cash. Patented and patent pending inventions only. Request our free book. No obligation. Dept. 2W, Universal Marketing Co., 354 South Spring St., Los Angeles 13, Calif.

INVENTORS—What have you, patented, patent pending to offer manufacturers? Our booklet free without obligation. Market Contacting & Data Service, 11106-B2 Longwood, Chicago 43.

INVENTIONS Wanted, Patented or Pending only. Inventors Exchange-D, Hartford 1 Conn.

INVENTORS Marketing Assistance. Circular Free, Stanley Hull, 7829-P Euclid, Cleveland 3, Ohio.

85 PATENTS

INVENTORS: Test the commercial value of your patented or unpatented inventions, quickly and inexpensively. Write for free information. Institute of American Inventors, Dept. 30-B, 631-E St., N. W., Washington 6, D. C.

88 MANUFACTURING

WOODWORKING Manufacturer with sales outlets for Patented twin folding tables, Benches, August Wessig, Box 454, Laramie, Wyoming.

89 MODELS, MODEL SUPPLIES

BUILD Historic Ship models, complete kits 39c to \$9.00, Catalog 10c, Ideal Models, 21 West 18th, New York 11, N. Y.

SHIP Model and yacht supplies, complete large 64 page catalogue, 30c, Wm. Wild, 510 E. 11th St., New York City.

SHIP and Yacht model fittings: blueprints, Send 25c for illustrated catalog No. 25—Listing hundreds of items, A. J. Fisher, 1002-2 Etowah, Royal Oak, Mich.

MINIATURE engines, castings and drawings, Catalog world's largest selection 25c, Miniature Engine Laboratories, 200-B Cement Ave., Sandusky, Ohio.

SHIP Models—most complete line in New England, Kits, parts, plans, books, Steam and electric power plants, Illustrated catalog 25c, James Bliss & Co., Inc., 220 State St., Boston, Mass.

NEW! Ship Model Builders Notebook, by Pratt modeling authority; 32 pages including 14 pages of detail drawings of help to beginner and experienced, Price \$1.00 postpaid, Catalog, 25c, Model Shipways, 476 Main St., Fort Lee, N. J.

POWER Models, Unusual steam, gasoline and traction engines, Metals, tools, accessories, New catalog 50c, Charles Cole, Ventura, Calif.

STEAM Engine 1½" Bore Horizontal Four valve Blueprints \$4.00, Also Prints, Engines, Pumps, Boilers, Fittings, Tools, Agent for magazine "Light Steam Power," Nicoli, First Avenue, York, Penna.

STEAM engines, boilers, castings, Catalog 25c, Anton Bohaboy, 2297 Price, Rahway, New Jersey.

91 HOME CRAFTSMEN

TURN your spare time into cash. Make quick-selling, highly profitable lamps—every home a prospect. No experience or special tools required. New 1950 56-page illustrated catalog shows shades, shade frames, figurines and bases, oil lamp converters, boring compounds, and dozens of similar items. Also all kinds of sockets, cords, pipes, harps, finials, bases, and hundreds of other parts—everything you need. Special 8-page section shows 6 beautiful lamps in kit form ready to assemble. You buy wholesale, sell at retail—make big profits. Hundreds doing it. You can, too. Send 25c today for catalog and wholesale price list. Refundable first order. Gearon Co., Dept. 500-A8, 27 S. Desplaines, Chicago 6, Illinois.

NEW 96 PAGE Leather and Craft catalog, 1000's of items. Send 10c, Russo Handicraft Supplies, Dept. 8-H, 245 South Spring, Los Angeles, California.

INCREASE Your Earnings. Learn watch repairing, clock repairing or jewelry repair and design. We furnish supplies and tools. A licensed school. Large percentage of students report good income in spare time while learning. Write today for Free information on course you want, Illinois School of Watch Repairing, Dept. CPS-8, 2870 Elston Ave., Chicago 18, Ill.

LEATHER tools, lacing, supplies, Free Catalog, National Handicraft, 199 William St., New York 7.

HOME sewers wanted—Illustrated folders, 10c, Baby-Gay, Beaver Dam 3, Wis.

8 BEAUTIFUL Full Size Whatnot patterns 25c, Joanness, P. O. Box 141-S, Omaha 7, Nebraska.

JIGSAW Owners attention! Start earning money at home cutting out wooden novelties and souvenirs. Write H. Cook, 4407 S. Normal Ave., Chicago 9, Ill.

FIX-O-STRIP, new miracle all around metal repair strip, pictured editorially June 1950, Popular Science, Page 225. Send \$1.10 for six Fifteen inch strips, receive metal file free, Jaysen Strips Co., 157 Adelphi St., Brooklyn 5, New York.

MICALITE Sign Letters! Reflect Light! Sample 25c, Harwell, Byrdstown, Tenn.

KNOCKDOWN Cedar Chest, Lumber and Veneers, Free Price List, Giles Co., Brownsboro, Alabama.

MAKE leather belts, billfolds, purses. Big catalog and genuine steerhide keyholder, 10c, Tandy Leather, Box 397D, Tulsa, Oklahoma.

LEATHERCRAFT, Copper tooling, Textile painting, Make spare time, profitable time! Free illustrated catalog shows everything you need, Kit Kraft, 7377 Melrose, Hollywood 46, California.

80 FULL sized patterns, toys, novelties, lawn ornaments, \$1.00, Modern Woodcraft, Saginaw, Mich.

BRASS and Copper Materials, 24 page catalog 10 cents, Groundmaster Company, Div. B, Boulder, Colorado.

LEATHERCRAFT, Everything needed by beginners, advanced hobbyists and professional leatherworkers. Largest stock of supplies in U. S. Moderate-priced tooling leathers, top quality calfskins, tools, supplies, kits, Send 10c for Big Catalog, J. C. Larson Co., 820 S. Tripp, Dept. 176, Chicago 24, Illinois.

PANEL-Form Chests, Cherry, Cedar, Walnut, Easy Assembly, Free Catalog, Eby Reproductions, Paradise, Penna.

90 ALL new, full size lawn ornament and novelty patterns, up to 20" high, Only \$1.00, Mastercraft 82S, 7041 Olcott, Chicago 31, Illinois.

16 NEW lawn chairs, 22 picnic tables, benches, trellises, etc. All 38 plans with necessary full size patterns, \$1.00, Mastercraft 83S, 7041 Olcott, Chicago 31, Illinois.

89 FULL size Jig Saw patterns of beautiful shelves, ornaments, toys, novelties. Plus "How, Where to Sell," Only \$1.00, Mastercraft 84S, 7041 Olcott, Chicago 31, Illinois.

92 BLUEPRINTS AND PLANS

HOME Freezer Plans \$3.00, 178 other Farm, Home Devices, Built from salvage materials, Handbook 25c (Refundable), Free Literature, Kimo, Box 307-PS, New York 19.

93 BUILD IT YOURSELF

STREAMLINED, Built-in Kitchen cabinets to fit any kitchen. Illustrated manual describes designing and construction. All for \$1.00, Thombert Company, Newton 11, Iowa.

BUILD Your Own Tractor, Plans, Walking, riding, Free information, Ellsworth Tractor Co., D-5 Camptonville, Cal.

SAFETY "Lawn Mower", Brush cutter, Small timber saw, Free plans, Eltraco, 55 Valdrive, Camptonville, California.

\$600, BUILDS Cozy 4 rooms and Bath, Concrete Block, stuccoed, Instructions & Blueprint \$1.00, Farrow, G-82, Box 645, Columbus 16, Ohio.

"CONCRETE Block Homes," 32 page booklet on how to build, \$1.00, Other Home Building booklets, \$1.00, H. C. Lightfoot, Civil Engineer, Richboro, Penna.

GRANDFATHER clock building made easy, Photopack plans, dollar, Kuempel Clox, Minneapolis 16, Minn.

KNOCKDOWN Cedar Chests lumber free, Price Catalog, Cedarcraft, Fayetteville, Tennessee.

94 WATCH REPAIRING

WATCHMAKERS' Journal contains helpful hints on watch repairing, Sample copy 20c, Dean Co., 116-B Nassau St., New York 7, New York.

WATCHMAKERS' Tools, Materials, Sold—Bought, Catalogue! Bengal Company, Culver City, California.

95 OLD GOLD, WATCHES, ETC.

HIGHEST Cash Paid For old, Broken Jewelry, Gold Teeth, Watches, Silverware, Diamonds, Spectacles, Platinum, Free information, Satisfaction Guaranteed, Government Licensed, Rose Smelting Company, 29-Y East Madison, Chicago.

96 JEWELRY

JEWELRY Making, Illustrated catalog 20c, George Sassen, 35 Maiden Lane, N. Y. C. 7.

JEWELRY Chain, Free Wholesale Catalogue, Florida Supply House, Bradenton, Florida.

100 MISCELLANEOUS

BOOKFINDERS! (Scarce, out-of-print, unusual books) Quickly supplied. Send wants, Clifton, Box 1377-PSM, Beverly Hills, Calif.

DRESSES 18c; Coats \$1.00; Blouses 35c, Free Catalog, Crown, 164-PC Monroe St., N. Y. 2.

FISH Tank Humus, Rich Infusoria, 50c, Gee, 1211 Frisco, Far Rockaway, N. Y.

"INTERESTING Mails"—25c keeps your mail box full three months, Bentz, Jr., Desk-B/71, Chatawa, Mississippi.

ATTENTION, New Swimming Sensation, Write Fanned Finger Manufacturing Co., 1716 E. Newton, Milwaukee 11, Wisconsin.

BRONZE Name Plates: Adds distinction to your residence, office, boat, summer cottage, Free catalog, Nelson Co., Dept 16, St. Paul 2, Minn.

"OPPORTUNITIES Galore"—Interesting, Profitable Mailing, 10c, Valles, Box 242-CH, Brooklyn 1, New York.

TREASURE—Mineral Locators—Geiger Counters can be purchased on monthly payment plan, Free literature, Fisher Research Lab., Inc., Palo Alto, Calif.

BIG Mails Three Month, 25c, year Name Listed Directory \$1.00, Harvey Teeple, Decatur, Indiana.

PANNING Gold Beginners booklet 36 pages, Catalogue—Supplies, Mining Books, Maps, "Where To Go" 25c, Old Prospector, B-317, Dutch Flat, Calif.

INCREDIBLE! Unprecedented! Become a mental superman overnight! Floor everybody! No studying! "Memoprop" does all your thinking! It's uncanny! Revolutionary! Write: Bijou, Box 1727-V2, Hollywood 28, California.

READ With Speed! New Amazing Method, Save hundreds of hours yearly, Free home test, No obligation, Rush postcard, C. Brownson, 9111 Hoyne, Chicago 20.

FIX-O-Strips, Notice, postal regulations requires full address, Jaysen Strips Co., 157 Adelphi St., Brooklyn 5, New York.

"LIQUID Lead", Bonds practically any metal, including aluminum, Works cold, Makes lead molds, Hundreds other uses, Amazing product that is needed in every home and shop, Trial kit \$1.00 postpaid, ANTI-oxidizing soldering flux for aluminum and other difficult soldering, such as cracked blocks and castings, tinning welds, etc. Two ounces \$1.00 postpaid, Both for \$1.85 postpaid, Critcher Specialty, 731-B W. Euclid, Detroit 2, Michigan.

101 FOR SALE—MISCELLANEOUS

FLAP or cord stock, Send for our special price list on U. S. Koylon Foam Rubber in bulk, Re-upholster seats, furniture, autos, etc. A.M.C. Supply Co., P.O. Box 1440B, Fort Worth, Texas.

102 WANTED MISCELLANEOUS

SCRAP Mercury (Quicksilver) Tantalum—Bismuth—Tungsten, Metallurgical Products Co. Established 1909, 35th & Moore Sts., Philadelphia 45, Pa.

103 FOR THE HOME

BED-DRY trains child quickly, Doctors recommend, Plans 25c, Wilson Company, Danville 1, Illinois.

104 PERSONAL

"HOW Can I Find Out?" You Can! Information discreetly developed, Any matter, person, problem, anywhere, Worldwide, Officially licensed, bonded service, Established 1922, Reasonable, Confidential, William Herman, 170 Broadway, New York.

BORROW by mail, Loans \$50 to \$300 to employed men and women, Easy, quick, Completely confidential, No endorsers, Repay in convenient monthly payments, Details free, in plain envelope, Give occupation, State Finance Co., 210 State Finance Bldg., Dept. L-14, Des Moines 9, Iowa.

ATHLETE'S Foot! Ringworm! Amazing New Preparation (DermOring), Sure remedy with one application, Money back guarantee, Send \$1.00 includes postage, Candido Pharmacy, Box P-1256, Albany, New York.

DETECTIVE'S Opportunities. Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

PSORIASIS Sufferers: Has everything failed to bring even temporary relief from scales, lesions and itching? Then write today for Free important information. You needn't invest one cent; Pixacol Company, Box 3583-S, Cleveland, Ohio.

"REMAIL Your Letters 25c Each. Ideal—1301 60th St. So. St. Petersburg, Fla."

INFORMATION for single people by Human Relations Consultant, Dr. B. Long, Box 375, Los Angeles 53, Calif.

MAILING Lists. Mailorder Buyers, opportunity seekers, etc. Fresh names compiled weekly, 1,000, \$3.00; Trial 300, \$1.00. Valuable mails, four months, 25c. Wright Publications, Memphis 8, Tenn.

MEXICAN Law. General Practice Attorney, 1203 Arizona Street, El Paso, Texas.

ARTHRITIS!! Rheumatism! How to Attack & Eradicate Forever. Guaranteed. Don't Suffer, \$1. Send Now, Hod Markley, (5) Allendale, N. J.

HYPNOTISM. Self-hypnosis courses. Free details. Craft Publications W2, 601 S. Vermont, Los Angeles 5, Calif.

WHEN an animal loses his Hair we know there's a reason. When man loses his Hair we think it's natural, but it is serious for him. Why not try Loreene Johnston's Compositions, used by her professionally in her establishment for over 25 years. They are available in a convenient sized package with directions for home use for \$25.00 a box. Some of her clients get as many as 45 applications out of a \$25.00 box. Free checkups can be had at her office at 9200 Hough Ave., Cleveland, Ohio. Write or telephone your order, which will be sent at once upon receipt of money order, certified check, or C.O.D. to 9200 Hough Ave., Cleveland 6, Ohio. Telephone Randolph 1-3773. Loreene Johnston, graduate nurse and licensed scalp specialist. None genuine without her signature.

BETTER Eyesight through simple exercises. Complete instructions \$1.00. Richards-Ravalioli, Box 652, McAlester, Okla.

106 ADVERTISING

AVOID costly advertising mistakes. Get enlightening Ad-Guide and Ratebook leading newspapers, magazines, mailing lists, 10c. Chicago Advertising Agency (Established 1900), Chicago 4.

ADVERTISE: 24 words, 40 Newspapers, \$3.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

24 WORDS in 50 Weeklies, \$4.96. H. J. Darnell, 730 Hays, Jackson, Tennessee.

ADVERTISE in 40 weeklies, 24 words, \$3.50. Pennebaker Advertising, San Marcos, Texas.

115 DRAWING & ART SUPPLIES

DRAFTING and artists' materials catalog—thousands of items—25c (deductible first \$2 order). Gordon's, 219 Madison, Chicago.

FREE art test. Give age information. Commercial, Box 8066, Dallas 5, Texas.

117 TATTOOING SUPPLIES

TATTOOING Outfits, Supplies, Illustrated List Free. Zeiss, 728 Lesley, Rockford, Illinois

120 CANDY MAKING

LEARN Professional candy making profitable home business. Details 10c. Pate, Kissimmee 2, Florida.

MEN-WOMEN—"Everybody Likes Candy." Learn to make professionally. (Our 40th year.) Ragsdale Candies, East Orange, New Jersey.

126 CAMPING

TENTS, all types & sizes, vast selection, camping equipment; war surplus. Lowest prices. Free catalogue. Morsan, 10-19Q 50th Avenue, Long Island City 1, N. Y.

131 TREASURE FINDERS

METAL Detectors. The very latest circuit. Send 25c for literature. Hedden Metal Detectors, 3329 Liberty Ave., Pittsburgh 1, Pa.

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guarantee best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1540 W. Glenoaks Blvd., Glendale 1, Calif.

SENSATIONAL new line of Geiger Counters for Uranium detection. All types, all prices. No finer selection! Also Mineralights and new gold, silver and mineral Detectors. Complete information Free. Detectron Co., 5631 Cahuenga, Dept. A-8, North Hollywood, California.

TREASURE—Mineral Locators—Geiger Counters M-Scope Type. Lightweight. Unsurpassed in efficiency. Factory guarantee. Lowest prices. Can be purchased on monthly payment plan. Free Literature. Fisher Research Lab., Inc., Palo Alto, Calif.

"**GEIGER** Counter Model C-18, fits coat pocket, 2 pounds weight, ultra sensitive, dependable. Immediate shipment, only \$35.00. Fisher Research Lab., Inc., Palo Alto, Calif."

INDICATOR: Locates buried money and minerals, price \$20.00. Instruments for locating oil. Made but these are not sold. Horton's Geological Oil Survey, Belle River, Illinois.

137 DETECTIVES

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

DETECTIVES needed everywhere. Join now, National, 3911 Tacon, Tampa 9, Fla.

140 HAIR PREPARATIONS

DANDRUFF? Itch? Hair Loss? Then send \$1.00 bill today for real scalp treatment formula. Gets results, S. Viggiano, Pharmacist, 6556 Ladson, Pittsburgh 6, Pa.

142 INFORMATION

AMATEURS—Radio and Electrical Research Engineering. H. Y. Twillmann, R. R. #1, Chesterfield, Mo.

The new — disappearing



car-bar

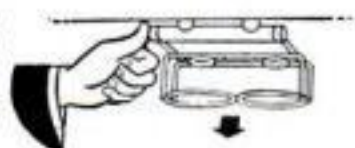
adds pleasure to eating and drinking in your auto . . .

\$3.95

Delivered postpaid

Not a gadget—but a sturdy, attractive accessory that fits any model car—easily and quickly installed to your dashboard. CAR-BAR makes the handiest receptacle for all types of glasses and drinks.

CAR-BAR folds and hides away when not in use. Push-'n-pull and presto! your CAR-BAR is ready to hold everything! CAR-BAR serves as convenient bottle opener, too.



CAR-BAR Window Tray

Fits easily on front or rear windows. Rust-proof, enameled finish, only **\$1**

MAIL YOUR ORDER TODAY

J. and B. Smith Co. P. O. Box 141 NO COD'S
Station D, Atlanta, Georgia

Please send me.....CAR-BARS @ \$3.95
.....CAR-BAR Window Trays @ \$1.00

NAME.....
ADDRESS.....

LEARN TO BE A

DIAMOND CUTTER

... AND EARN BIG PAY!

ENROLL NOW FOR 58 WEEK COURSE AT THE ONLY SCHOOL IN AMERICA TRAINING MEN IN THIS PROFESSION

You can become an expert in this exclusive highly paid profession . . . in only 14½ months! It is a fascinating, highly-skilled field offering lifetime security, high income to qualified people. And there's always a demand for your services.

At STEWART GEM & DIAMOND CUTTING INSTITUTE you learn by doing . . . under the trained eye of craftsmen with 15 to 20 years experience. You get 5 full hours of personal instruction daily in this intensive course. Also night classes for students who must earn money while studying.

Course prepares you for several lucrative fields: Diamond Cutter, Gem Cutter, Stone Buyer, Jewelry Sales, Jewelry Wholesaler and Importer, Jewelry Grader, Jewelry Appraiser.

We are limited to only 415 students. So don't delay . . . **WRITE** now . . . **TODAY** . . . for full details. Approved for G.I.'s.

SEND FOR FREE LITERATURE TODAY
STEWART GEM & DIAMOND CUTTING
INSTITUTE

565 MAIN AVE. • PASSAIC, NEW JERSEY

Coronado "pose-breefs"

THE NEW BODY-MOLD TRUNKS FOR IDEAL BODY DISPLAY. WORN BY LEADING BODY BUILDERS OF THE WORLD!

Here's the perfect brief trunks for body building, lifting, swimming, physique photography and contests. Designed by champions... worn by leading body builders of the world. No bind, no boxed or chopped off appearance. Body-mold fit for tall or short men in sizes 26 to 38. Complete freedom... complete coverage. Satisfaction guaranteed. Send check or money order today. Postpaid.

8 colors: white, black, light blue, royal blue, red, gold, aqua or chartreuse.

- | | |
|---|-----------------|
| 1. Elasticized Nylon, the very finest . . . | 7 ⁹⁵ |
| 2. Elasticized Nylon and Acetate . . . | 5 ⁹⁵ |
| 3. Elasticized Satin Acetate . . . | 4 ⁹⁵ |
| 4. Workout trunks Assorted colors . . . | 3 ⁹⁵ |



A TWO-INCH HIGH WAIST



B MEDIUM HIGH THIGH CUT



C EXTRA HIGH THIGH CUT (BELOW)



LEO STERN
Mr. California '46
shown above in his "pose-breefs"

Coronado Surf Shop,
627 8th Avenue, San Diego 1, California

Please send me, postpaid, Pose-Breefs as follows: (Circle)
Style **A B C** Fabric No. **1 2 3 4**

Color: 1st choice _____ 2nd choice _____ Size _____

Name _____

Address _____

City _____ State _____

☐ Please send your illustrated brochure

YOUR CAR'S GAS GAUGE IS NO GOOD TO YOU UNLESS...

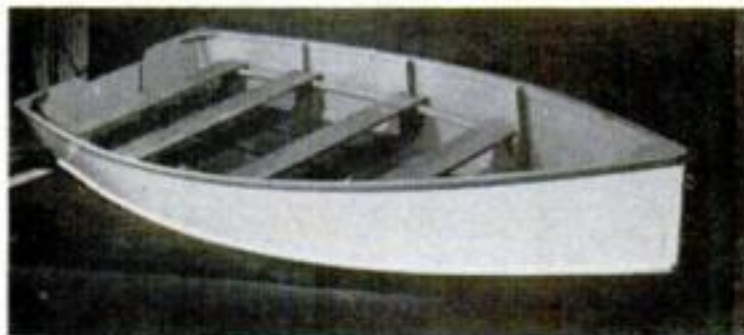
... unless you care whether or not you are running out of fuel. Neither is a **HULL AUTO-MOBILE COMPASS** of value to you, unless you care which way you are going. See Hull Compasses at your dealer's, or write for circular.

Beaconlite illuminated \$5.95 **Streamline standard \$3.95**

HULL MFG. COMPANY, P.O. Box 246-E8, Warren, Ohio.



HAVE A BETTER BOAT Build your own And Save 50%



No experience needed. All difficult parts assembled at factory. Foolproof step-by-step instructions with each kit. All kits complete. Only top quality approved marine materials. 14' skiff illustrated. Five other models available from \$42.50 & up. Send 20¢ for illustrated catalog. Available in Canada through Sturdy Plywood and Woodworking Co. 1927 Davenport Road, Toronto. Write for name of nearest **ROBERTS** dealer or—order direct.

ROBERTS INDUSTRIES, INC.
353 Main St. Durham, Connecticut



GANGWAY! I'M DOING 50!

Large, easy-to-read dial gives speeds up to 50 mph on amazing new

Air-Flight BICYCLE SPEEDOMETER

for bicycles, scooters, tricycles, motor scooters, etc. Uses same principle as aircraft air-speed indicators.

39¢

At dealers, or send 39¢ plus 6¢ for postage.

INSTRUMENT DIVISION
KNICKERBOCKER PLASTIC CO., INC.
4101 San Fernando Road • Glendale 4, California



HUSKY HITCH

WORLD'S FINEST TRAILER HITCH

Acts As Rugged Bumper Guard

FREE FOLDER!

Write, give car make, year.

HUSKY HITCH, Dept. PS-80, 118 E. Pomona Ave., Monrovia, Calif.

NEW STREAMLINED TRAILER HITCH
CUSTOM MADE FOR YOUR NEW CAR!



Handsome Husky Hitch is a heavy duty trailer hitch with boat keel design, railroad coupling construction. No extras to buy—everything furnished!

- Rust-proof hitch ball
- Smooth contours prevent snags
- Permanent gleaming chrome plate
- Hitch ball has removable cap cover

MAKE! FOLDING TABLES - BENCHES - HORSES - IN A JIFFY

FOLD-A-WAY CHANNEL STEEL LEGS

Shipped complete, ready to fasten to your top in a minute. Rubber tipped. Used on the job, in homes, workshops, ping pong tables, trailers, camps, boats, churches, lodges, banquet halls.

Send for free circular

\$4.98 Pr. 24" Legs
\$5.98 Pr. 30" Legs
Postpaid in U.S.A.



THE DIAMOND MFG. COMPANY
Dept. PS, 1100 Altamont Ave. Schenectady 7, N.Y.

Say You Saw
It In Popular Science

NEW THRILL **PLUG CASTERS!**

USE REAL MINNOW PRESERVED FOREVER IN CLEAR PLASTIC!



Gets Bass, Wall-Eye, Muskies

Pat. Appl. for **\$2.00 Postpaid**

Here is **PERMA-LURE**, the newest plug-casting thrill, a genuine natural minnow encased permanently in solid crystal clear plastic. Use it year after year! Incredibly lifelike! Terrific attraction for record-breaking Bass, Wall-Eye, Muskies! Daily limits! Ideal gift. **ORDER NOW \$2.00 each postpaid** in U.S. or C.O.D. plus charges. You will be pleased or your money back. Dealers, write.

SPEEDSITE SALES, Dept. P, P. O. Box 83, Grand Rapids, Mich.

As the Cars Go

By ROD RODRIGUEZ

Auto Editor

SHOULD YOU PLAN to polish your car, investigate Autobrite®, a new silicone process distributed by Boyle-Midway Inc., Division of the American Home Products Corp. It's on sale at hardware, variety, grocery, drug, auto accessory and department stores. Autobrite gives a car a super shine which will last six months or more and takes only minutes to do it.

It protects against oxidation, rust and corrosion. It gives a glass-hard surface that keeps moisture and heat from penetrating paint and chrome surfaces, and is resistant to blistering sun, rains, ice, dust, fumes and even corrosive sea air.

* * *

Reprinted from editions of Sunday, April 30, 1950
by permission of New York Mirror

100 ALL STAR MODEL POSES

FULL
LIFE SIZE
PROJECTOR
UP TO 4' x 6'
\$10 Value
Now \$4.95 post-
paid

**GORGEOUS PROFESSIONAL
MODELS IN 100 POSES ON
16 MM FILM STRIP**

Superb camera studies of 100 thrilling beauties. Ideal for discriminating sculptors, artists, art students, photography students. Add 10c for postage. Order Now!

\$1.00

Magnify-
ing viewer
for per-
fect detail **\$1**

BENEFIT CORP., Dept. A-28
3807 Benefit Street,
Baltimore 24, Md.

See The Wonders of the Heavens!

Amazing value! Wonderful 192-page cloth-bound book, *Everybody's Guide to Astronomy*, now yours for only \$1.00! Contains star charts, tables, telescope-making instructions, how-to-do-it ideas for astronomical equipment you can build, etc. *Supply limited! Order today!* Write:

POPULAR SCIENCE
Dept. 849, 353 4th Ave. New York 10, N. Y.

IDEAL LAWNMOWER SHARPENER



Saves work, saves time, helps you earn extra dollars! Sharpens hand, power mowers without disassembling. Complete shop in one machine—equipped with Bed Knife Grinder and "lapping-in" Reconditioner. Home owners, parks, clubs, cemeteries pay good money for efficient sharpening; get your share!

WRITE NOW FOR FREE CATALOG

THE FATE-ROOT-HEATH CO., Dept. I-4, Plymouth, Ohio

"TOOK IN \$217 FIRST 10 DAYS"

Some Make More,
Some Less . . .

**We Help You
to Start Your Own
All-Year Business,
Make Big Money!**



With our easily operated, highly efficient wall washer, Chas. Stelle took in \$217 gross in first ten days. E. L. Goss took in more than \$10,000 in one year. E. C. Taber wrote, "I made \$400 gross in two weeks." And no wonder—this machine washes walls 6 times faster and better than by hand.

YOUR MONEY-MAKING OPPORTUNITY

We want more men to go into this profitable business for themselves and enjoy independence. There are customers everywhere—homes, offices, schools, churches, hotels, stores, etc. What you take in is mostly profit, for material costs are low. And there's no need to rent a shop or office. Operate your business from your home.

Lose no time. Get all facts without obligation. WRITE FOR FREE INFORMATION. Ask for Wall Washer Details at once.

VON SCHRADER MFG. CO., 867 PL., Racine, Wis.



FREE SAMPLES! GLOW IN THE DARK!

BIG PROFITS showing amazing Luminous Specialties—house numbers, pictures, plastic novelties, religious and nursery objects, ash trays, key-holders, etc. Large manufacturer. Enormous demand. Sell on sight. WRITE AT ONCE for FREE samples. Madison Mills, 303 4th Ave., Dept. M-5, New York 10, N.Y.

Own, Operate, Maintain
for less than **3/4¢** a mile

Cushman
MOTOR SCOOTER

75
MILES
PER
GALLON



"Boy! I sure do like my Cushman! Speeds me anywhere. AT A M A Z I N G LOW COST! Gives over 75 mi. per gallon! Cheaper than bus fare or operating your car. Handles easy. Slips through traffic. Wonderful for getting to work, school or market—making deliveries or taking pleasure spins. Famous "Husky" engine.

See your Cushman dealer for demonstration. Or rush card for Free Folder. Write to Dept. P-8

DEALER
INQUIRIES
INVITED

CUSHMAN MOTOR WORKS, Inc
LINCOLN NEBRASKA U.S.A.

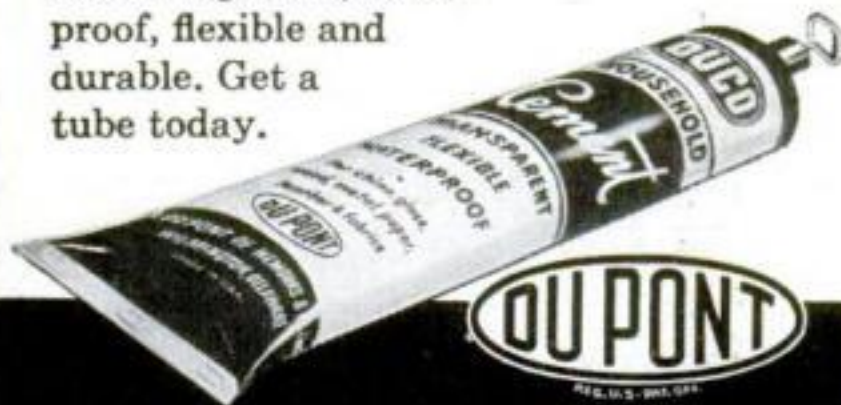


"SAVE IT AND
FIX IT"

MENDS

DISHES, FURNITURE, LUGGAGE

It's transparent, water-
proof, flexible and
durable. Get a
tube today.



DUCO CEMENT

REG. U. S. PAT. OFF.



STOP COSTLY Upper Cylinder WEAR

with the
**UNIVERSAL
TOP OILER**

★★

Atomizes top cylinder oil and distributes it evenly to upper cylinder area of car engines. Stops excessive piston, ring, and cylinder wear caused by insufficient upper cylinder lubrication. Frees sticky valves, prevents gum formation, reduces oil and gas consumption. Quickly pays for itself because of lower repair bills and better engine performance. Furnished complete—installed in 30 minutes with easy-to-follow instructions. Approved by leading top oil marketers. MONEY BACK GUARANTEE.

Only
\$8.95
Postpaid

Best Top Oiler Buy AT ANY PRICE

NATIONAL APPLIANCES, INC.
300 N. Lexington Ave., Pittsburgh 8, Pa.

- ☐ Send UNIVERSAL Top Oiler at once.
☐ Check or money order enclosed. ☐ Send C.O.D.
☐ Send descriptive literature.

Name _____
Address _____
City _____ State _____



STOP DRIP

caused from condensation on cold water pipes. Turn idle basement space into play or work rooms. Keep store rooms dry. Just wrap cork-filled No-Drip Tape around pipes and joints.

Do it yourself. Clean and easy to apply. Roll covers about 10 feet of 1/2" pipe. \$1.69. Higher west of Rockies and Canada.

**NoDrip
TAPE**

Get at Hardware, Department Stores, or sent post-paid. Write for free circular. J. W. Mortell Co., 534 Burch St., Kankakee, Illinois.



Look—a 10 1/2 x 4, 6-ply Tire. Tube. Machined Wheel and Bearing at a "give away" price. Supplied in two types:—

1. With Highspeed **TIMKEN BEARING** (with Grease Retainer) **\$8.95**
2. With Slowspeed **NEEDLE BEARING** (with Grease Retainer) **\$5.95**

Freight Collect (18 1/2 lb.)

Ideal for Handcarts, Buggies, Trailers, Soapbox Racers, etc. A bargain from the world's largest stock of all types of Airplane Tires. Send your check or money order to:

Airplane Tire Co., 99 Hiway, Tulare S., California



TAKE 3-DIMENSIONAL PICTURES WITH YOUR OWN 35MM CAMERA

NOW ONLY (Outfit No. 101, was \$22.50 plus tax)

STEREO-TACH **\$17.70**

Plus \$2.09
Fed. Tax

and 3-D Slide Viewer complete. Make marvelous stereo color or b & w slides. Get Stereo-Tach from your dealer or direct. Money back guarantee.



Dept. PS-8 ADVERTISING DISPLAYS, INC. Covington, Ky.

SAVE 1/3 ON NEW POWERBIKE!

PRESTO—your bike's a speedy **POWERBIKE** when you install new **POWERBIKE** unit. Amazing new **DIRECT FROM FACTORY PLAN** now offers you speedy low cost transportation for only \$18.23 down. Send stamp for **FREE PICTURE CATALOG**.

SAGINAW PRODUCTS CORP.
113 River St. Saginaw, Mich.



HOLLYWOOD MUFFLER

THE TONE YOU LOVE TO HEAR

MORE SPEED—POWER—MILEAGE

are yours with a Hollywood Muffler . . . plus a tone you'll love to hear! Not a gutted muffler. Easy to install.

Hollywood Muffler:
Trade-mark Reg.
U. S. Pat. Off.

Dealers
Write

**IMPROVED
DESIGN
PRECISION MADE
ELECTRIC WELDED!**

Outlasts ordinary mufflers 3 to 1

Ford, Chevrolet, Plymouth \$6.00

All other cars \$8.00

Duals, Ford & Merc. \$24.50. 3" Chrome Barker Tip. \$3.25. Order direct. Send check or M.O. and save postage.

TOM WILKINSON MUFFLER CO. 811 WILT STREET
FT. WAYNE, IND.



PAINTERS' STRIPING TOOL

A TOOL... NOT A BRUSH

NEW, IMPROVED

Modern—streamlined—fits the hand like a fountain pen! Easy to use as a pencil. Draws parallel lines—straight, curve, or circular. Does expert job on autos, furniture, toys, bikes, model planes, signs, bulletins, linoleum. (Makes wall board look like tile.) Every painter and craftsman needs one! Type "M" MASTER Painters' Striping Tool complete with tip for 1/16" stripe, \$1.00. Other tools complete with following tips: 1/64", 1/32", 3/64", 5/64", 3/32", 1/8", \$1.50 ea. Extra tips 75c ea. Entire kit with tool and 7 tips, \$5.00. (COD's postage collect) DEALERS WRITE!

\$1.00 POST PAID

EASY AS USING A PENCIL!

WENDELL MFG. CO.

4234-A Lincoln Ave., Chicago 18, Illinois

NEW PACKAGED BOATS



17 models. 8'-16': Tredonic racers, cruisers; Outboard, inboard, skiffs. Assembled frames; Tri-Keel construction; Tredonic bottom; spray rails; easy to build!

SEND 25c FOR CATALOG!

Catalog and booklet "Plywood Boats", \$1.00

BOAT PATTERNS-BLUE PRINTS

1950 Catalog—100 designs by naval architects. Racing classes, cruisers, inboard, outboard, sail. 6 to 35 ft. Plywood—Steel—Plank. Construction plans, full-size patterns. SEND 35c FOR CATALOG or \$1.00 for catalog and booklet on "Boat Building."

MARINE MART-DEPT. 24-BUFFALO 7, N. Y.

Say You Saw
It In Popular Science

Free Book



RAISE HAMSTERS.

The new wonder animals from Syria. Often called Toy Bears. Delightful pets. Everyone wants them. Laboratories need thousands. Clean, odorless. Raise anywhere. A profitable and interesting hobby or business. We furnish breeders and instructions. Write today for free book.

GULF HAMSTERY, 1540 BASIL ST., MOBILE, ALA.

NEW! Trash Disposal Unit Burns Refuse Safely



● A new type outdoor dispose-all unit safely and quickly burns garbage and trash in any weather. All refuse, damp, green or dry is fully consumed. Scientific draft design completely eliminates fire hazard of flying ash, sparks, burning, blowing bits of paper. Intense combustion removes neighbor-annoying nuisance of flying scraps, smoke, smell.

Sturdily built to last for years. Nothing to get out of order. Needs no watching. Will not blow over. Will not destroy grass or shrubs. Ends refuse hauling and fire hazards to quickly pay for itself. Measures 23" square at base by 40" high. Weighs 23 lbs. Over 2 bu. capacity. Recommended by Bureaus of Fire Prevention. Full price \$9.95—nothing else to buy. Sent F.O.B. Cleveland. Money back guarantee. Send check, cash, or money order to:

ALSTO COMPANY, Engineers Bldg., Dept. PS-8, Cleveland 1, Ohio

You'll always
be proud to say

"Mine's a
Winchester"

... and no wonder! For the name Winchester on your 22 is a name which is reverently echoed in every corner of the earth from the cold north country to the steaming jungles of the tropics.

The Model 61 shown at left is a sportsman's dream come true. A light, finely-balanced, slide-action repeater that is well adapted for moving targets, running small game... all types of 22 shooting. Genuine American walnut stock... proof-steel barrel. Holds 14 Long Rifle, 16 Long, or 20 Short 22 caliber cartridges interchangeably. Also furnished in 22 W. R. F. only. See it at your dealer's.

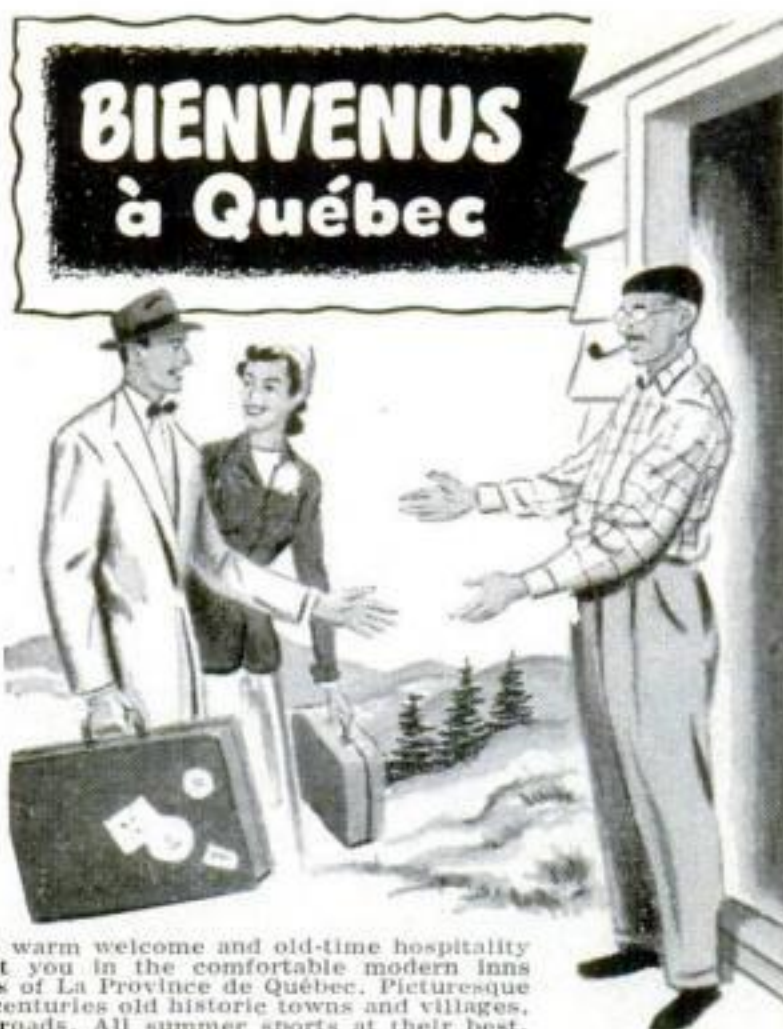


FREE! Folder giving full details of all Winchester 22 caliber sporting and target rifles. Address: Dept. 343-C, Winchester Repeating Arms Co., Division of Olin Industries, Inc., New Haven 4, Conn.

ANOTHER
OLIN
PRODUCT

The World Famous Model 61
WINCHESTER
TRADE-MARK
SPORTING RIFLE

AUGUST 1950 67



Enjoy the warm welcome and old-time hospitality that await you in the comfortable modern inns and hotels of La Province de Québec. Picturesque scenery, centuries old historic towns and villages. Splendid roads. All summer sports at their best.

LA PROVINCE DE Québec

For help in planning a vacation that is different, or for information concerning the unsurpassed industrial opportunities in our province, write the Provincial Publicity Bureau, Parliament Buildings, Québec City, Canada; or 58 Rockefeller Plaza, New York City 20.

Pioneers **AIR RIFLES** **BENJAMIN** **Leaders** **AIR PISTOLS**

SHOOT WITH SAFETY

BE SAFE—SHOOT WITH COMPRESSED AIR—ALWAYS READY
No Cartridges or Tanks to Replace or Recharge. If you want the most **PRACTICAL GUN** to use anywhere—inside or outdoors—get a **SAFE—CLEAN—ECONOMICAL BENJAMIN** with Adjustable Power and Amazing Accuracy. Send for Free Folder of Latest Models Today. **BENJAMIN AIR RIFLE CO., 853 MARION ST., ST. LOUIS 4, MO.**

BEAUTIFIES natural wood, pine paneling

POLISHES furniture, woodwork

IMPROVES paint jobs

PROTECTS wood and metal surfaces

49¢ 89¢
PINT QUART

101 HANDY HOME USES!
Every home, every workshop, needs Pol-mer-ik BOILED Linseed Oil. Free folder tells you how to use it. Write . . .

ARCHER-DANIELS-MIDLAND CO., Minneapolis 2, Minn.

Easy To Build

U-MAK-IT BOAT KITS

ROWBOATS

OUTBOARDS

INBOARDS & CRUISERS

SEND 25c (coin) NEW CATALOG ORDER YOURS TODAY

U-MAK-IT PRODUCTS 703R-WHITTIER ST. New York 59, N. Y.

WHAM-O SPORTSMAN *

HITS LIKE A .22 RIFLE—
KILLS RABBITS, SQUIRRELS.
Powerful, silent, accurate.
For hunting, target,
routing pests.

"Dealers
Write"

HUNTING SLINGSHOT

Heavy ash hardwood stock.
40 steel balls, extra rubber straps.
GUARANTEED. Send \$1.00 today to
Wham-O Mfg. Co., Box 85, South Pasadena, Calif.

* The professional model of Nat'l Slingshot Assn.

Build your own JET ENGINE!

Order these plans today

1. JET PROPELLED BICYCLE. Assemble your own. Photo and instructions \$1.00.
2. HOW TO MAKE EXPERIMENTAL JET ENGINES. Seven sheets drawings with information and instructions \$2.95.
3. BOTH OF ABOVE in one order \$3.75. SEND NO MONEY. Order both at once \$3.75 C.O.D. in USA plus c.o.d. postage. Send check or Money Order and we pay postage. Get other information too. Rush Order.

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio

GLO-TAPE

LUMINOUS TAPE

that shines in the dark

No more tumbling, stumbling at nite!

Now! LUMINOUS waterproof, durable tape sticks to any surface! 1001 uses in every home, office, factory. Your guiding lite when lites go out! Stick a strip near lite-switches, door-bells, steps, baby's crib, house numbers, etc. Handy GLO-TAPE seals, mends. Be safe! Order now! No C.O.D.'s under \$1.

18 ft.-50c; 50 ft.-\$1.00; 100 ft.-\$2.00 (roll 1/2")

NOVEL, Dept. S, 3 Bleecker St., New York City

Steel-Grip INDUSTRIAL Safety Apparel

Famous Industrial Safeguards Since 1910

Save Fingers with Industrial Finger Guards

Lower Your Hand Protection Cost

Hundreds of factories save time and injuries by protecting workers with Industrial Finger Guards. Used for handling rough or sharp articles, for buffing, grinding, sanding, polishing and punch press work and hundreds of other jobs. Protect fingers or thumbs, front or back, from cuts, abrasions or blisters. Various designs made in several leathers and other materials, with elastic web back for snug, cool, comfortable fit. Sizes for men or women. Send 10c each for samples. Catalog of Safety Apparel Free. Write.

INDUSTRIAL GLOVES CO.
1433 Garfield, Danville, Illinois
(In Canada: Safety Supply Co., Toronto)



MOTORCYCLING— World's Greatest Sport!

Ride a
HARLEY-DAVIDSON
HYDRA-GLIDE

THE lure of motorcycling is like nothing else in this world! Once it's in your blood... brother, you'll never be the same again! From then on, nothing can ever equal the fascination of cruising down a scenic country road with a Harley-Davidson purring quietly under you... the he-man thrill of soaring up a steep hill like a climbing jet... the breathless feeling of levelling off for the straight-aways... the sense of power and freedom you get whenever you settle back in the saddle and "give 'er the gun!" In no other sport are friends so loyal, gals so glamorous. Nowhere is fun so easy to find as at exciting race meets, hillclimbs, gypsy tours and other club events. A Harley-Davidson is your ticket to endless good times, to happy, healthful outdoor enjoyment. You can own one on easy terms. So why not get started now? See your dealer today.



HARLEY-DAVIDSON MOTOR CO., Dept. PS, Milwaukee 1, Wisconsin

Send me FREE copy of ENTHUSIAST Magazine filled with motorcycle action pictures and stories.

Name.....

Address.....

City..... State.....

DEALERS: Valuable franchises are now available for the full line of famous Big Twins and the 125 Models. This is your opportunity to line up with the greatest name in motorcycles. Write or wire for complete information today.

AUGUST 1950 69



Ideas out of this World

... yours with these
Wizards with Wood

Ideas for bonding wood! Ideas for finishing effects! Want 'em? Then send postcard for leaflets on Firzite, Satinlac, Weldwood Glue — used by professionals and offered by United States Plywood Corporation. . . .

Strongest Wood Glue Ever Made



To make things or fix things, use Weldwood Glue for all wood-to-wood bonds. Makes joints stronger than the wood itself. Mixes easily with water. Stain-free, rot-proof . . . highly water-resistant! 15¢, 35¢, 65¢, 95¢ and larger sizes.

WELDWOOD
PLASTIC RESIN GLUE

A MUST for Finishing Fir Plywood



Tame that wild grain with FIRZITE. It tight-seals the pores . . . virtually prevents grain rise or checking . . . readies the surface satin-smooth for paint, stain or enamel. (For blond, pickled, wiped or tinted effects use White Firzite).

FIRZITE

Newer than Shellac or Varnish



Pints, Quarts,
Gallons

For "natural wood" finishes on furniture or woodwork, there's nothing like Satinlac. Brings out the natural grain and color beauty of any plywood or solid wood. Avoids that "built-up" look, and will never turn yellow or darken with age. "Water-white", easy to brush or spray, dries ready for next coat in 2 or 3 hours.

SATINLAC

Ask for Weldwood Glue, Firzite and Satinlac at hardware, paint or lumber dealers.

Send post card for interesting glue and finishing leaflets.

UNITED STATES PLYWOOD CORPORATION

Dept. 89, 55 West 44th St. • New York 18, N.Y.

HEED THIS NOTICE! Our Tires Are NOT Re-treads, Re-grooved or NEW Treads that have been re-capped. Our MATCHED tires give you REAL ECONOMY—the BEST for LESS. You've seen our adv. month after month for years. We serve TRUCKS, BUSES and CARS. OUT-OF-TOWN folks buy now and take off 20% discount. Our EXPERIENCE assures you the BEST BUY in good ORIGINAL USED Tires. One Quality—One Price.



Don't Send a Cent

Until you see our tires. Remember you get what we advertise. We ship only good USED original tread tires. A trial of one tire is worth a thousand words and will make you a satisfied customer. We guarantee a special personal selection of tires for you.

BUT IF YOU SEND CHECK OR MONEY ORDER IN FULL WITH THIS AD "NOW" — you may take **20%** discount on every tire. SAVE TIME — SAVE MONEY **20%** TUBE GIVEN WITH EACH PASSENGER & TRUCK TIRE AT NO EXTRA COST SEND THIS AD

WRITTEN GUARANTEE—Sent with every tire you buy

These are **** Original Tread Tires — OUR BEST Can be used for "Every Purpose" — No Re-caps or Re-grooved READ THAT TOP NOTICE AGAIN AND SAVE \$ \$ \$

600-16	\$5.55	650-16	\$5.95	700-15	\$5.85	475-19	\$5.95
650-16 (6)	6.50	700-17	9.99	650-15	5.75	525-18	5.95
700-16	6.85	750-16	7.95	550-17	6.75	550-16	5.55



WE SPECIALIZE IN TRUCK TIRES **** Matched Tires Shipped all over USA and Foreign Countries. IMMEDIATE SHIPMENTS Same Day. Depend on STANDARD for SERVICE. Roll along those EXTRA MILES without Delays and SAVE \$ \$ \$

600-20	\$9.95	32x6(8)	\$10.95	900-20516.66	1000-22516.66
650-20	9.95	32x6(10)	13.95	1000-20 17.77	1100-22 17.77
700-20	10.95	750-20(10)	13.95	1100-20 18.88	1100-24 18.88
750-20	10.95	825-20	17.77	750-15 11.45	700-17 13.33

MILITARY *** GRADE TRUCK TIRES**

9.00-16	\$12.22	7.50-20	\$13.00
---------	-------	---------	---------	-------	---------

Thousands of Tires Shipped to Satisfied Customers. Remember Send This Ad with Check or Money Order to Dept 5.

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

BUILD YOUR OWN FAN



One-piece cast aluminum propellers for cooling and ventilating.

Size	Polished		Unpolished		Bore		
Inches	2 Blade	3 Blade	2 Blade	3 Blade			Inches
15	\$3.00	\$4.00	\$2.50	\$3.00	1/2	5/8	3/4
18	3.75	4.50	3.00	3.50	1/2	5/8	3/4
20	4.00	5.00	3.25	4.00	1/2	5/8	3/4
24	4.50	5.50	4.00	4.50	1/2	5/8	3/4

Let us give you our prices on your aluminum castings.

Write for pamphlet on larger fan blades, wire guards, fan bases, shutters, pillow blocks, exhaust fan frames, etc. Shipped prepaid if money accompanies order. Dealers write for discount.

KLOPPENBORG ALUMINUM FDY., Dept. P580, Davenport, Iowa

FREE
Bargain
Book

Packed with hundreds of sensational bargains—new and used—in still and movie photo equipment and accessories. Write for your free copy today to

Central Camera Co.

Dept. 10H, 230 S. Wabash, Chicago 4, Ill.

Photographic Headquarters Since 1899

Thompson
BEATS
the World
on **BOATS**



**Better Built
Lower Prices**

Canoes

Rowboats

Outboards

**Safe Boats With
Full Length Spray Rails**

Keep passengers perfectly dry—even at high speeds. Catalog also shows two new models of "Take-Along" Boats. Two big factories—save you freight.

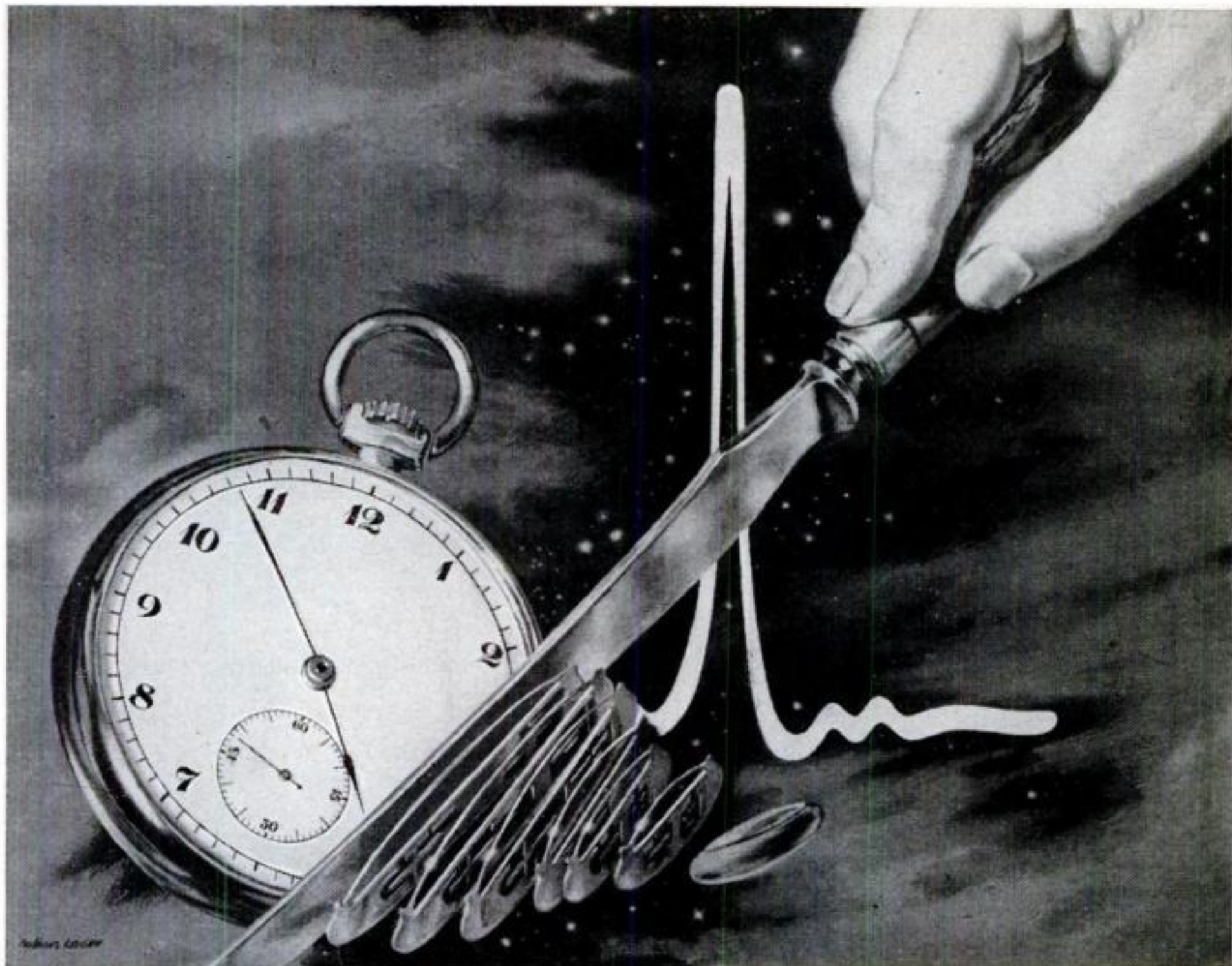
CATALOG FREE
Write for your copy. State kind of boat in which you are interested.

THOMPSON BROS. BOAT MFG. CO. (151)
219 Ann St.
PESHTIGO, WIS.

(Write to either place)

Light Boat for Auto

**119 Elm St.
CORTLAND, N.Y.**



New RCA electron tube "freezes" movements that occur, and are ended, in millionths of a second!

How to "see" a super fine slice of time!

Now scientists at RCA Laboratories work with slivers of time too infinitesimal for most of us to imagine. Their new electron tube, the Graphechon, makes it possible.

For instance, in atomic research, a burst of nuclear energy may flare up and vanish in a *hundred-millionth* of a second. The Graphechon tube oscillograph takes the pattern from an electronic circuit, and recreates it in an image which can last for a

minute and a half. Scientists may then observe the pattern of the burst . . . measure its energy and duration.

With Graphechon we can now watch fleeting phenomena which occur at random, outside our control. It is not only applied to nuclear research, but also to studies of electrical current . . . or in new uses of radar and television. Like so many products of RCA research, Graphechon widens man's horizons.

See the latest wonders of radio, television, and electronics in action at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, Radio City, N. Y. 20.



Progressive research, like that which gave us the Graphechon tube, accounts for the superiority of RCA Victor's new 1950 home television receivers.



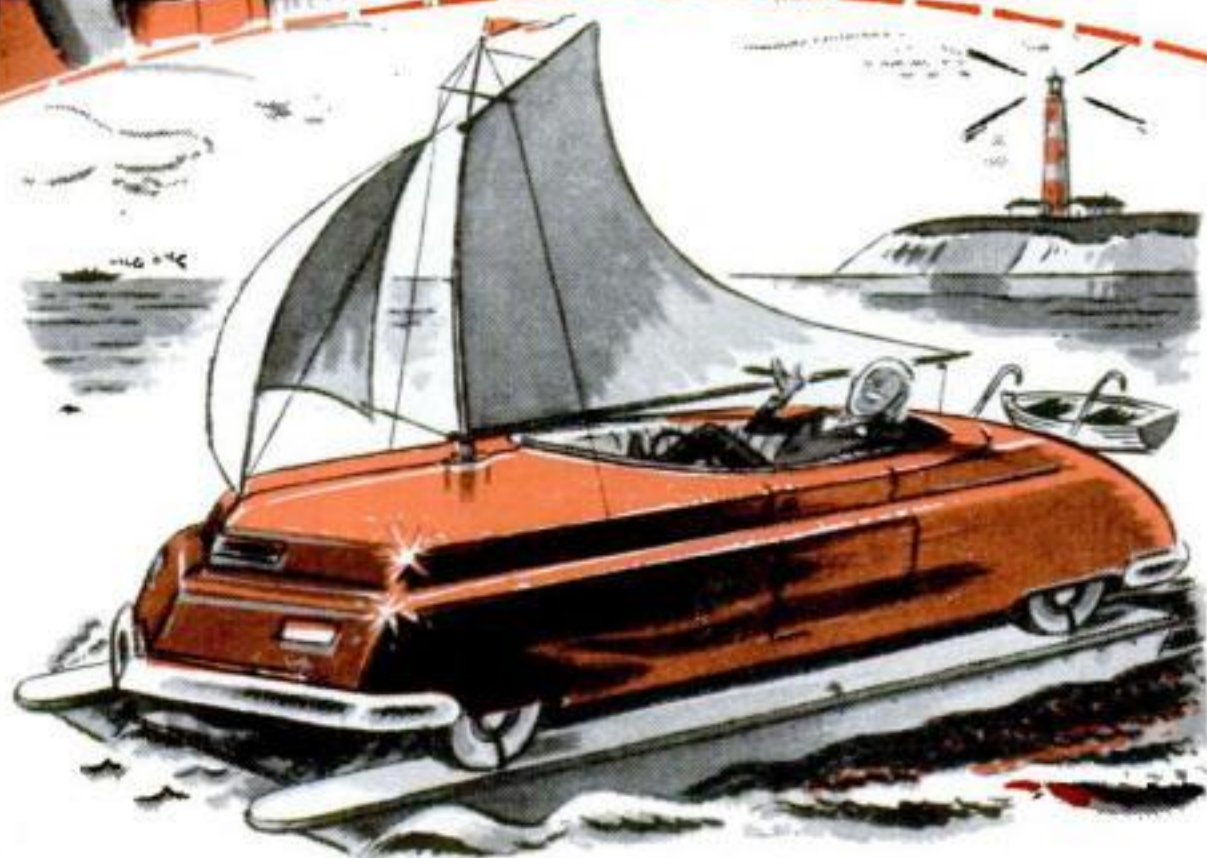
RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

WHEN YOUR WHITTLING
TURNS OUT LIKE THIS...
IT'S TIME FOR A WHETSTONE

and

IF YOUR CAR FEELS LIKE THIS
...IT'S TIME FOR MARFAK
CHASSIS LUBRICATION



THAT CUSHIONY FEELING LASTS LONGER WITH **MARFAK!**

Want summer driving that's *smooth* pleasure? Get longer-lasting *Marfak* lubrication! Tough, clingy *Marfak* sticks to its job — protecting chassis wear points and bearings for a thousand miles and *more*. Resists squeeze-out and wash-out, stands up to road poundings. You've got the proof in that swell "cushiony" driving ease that lasts! Get *Marfak* lubrication today from your neighborhood Texaco Dealer, *the best friend your car ever had.*



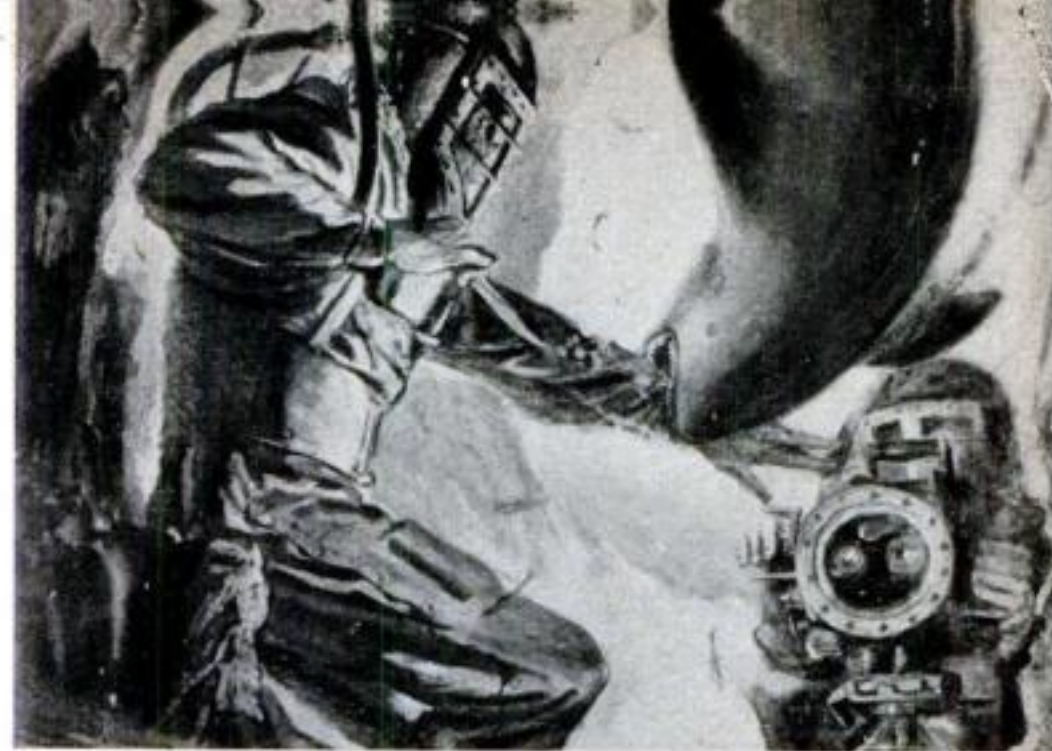
THE TEXAS COMPANY
TEXACO DEALERS IN ALL 48 STATES

Texaco Products are also distributed in Canada and in Latin America

Popular Science

Highlights

this Month



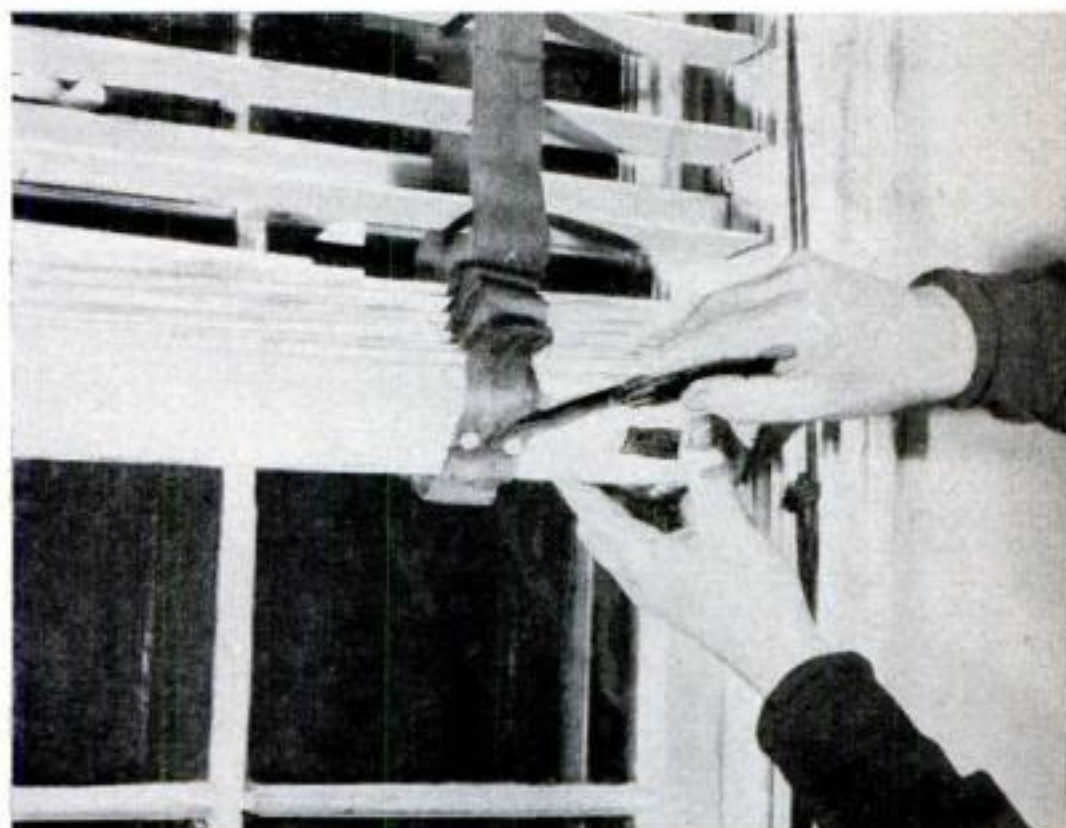
Battling Shark: Undersea cameramen risk their lives to record for you the thrills of an unexpected adventure.

Page 100



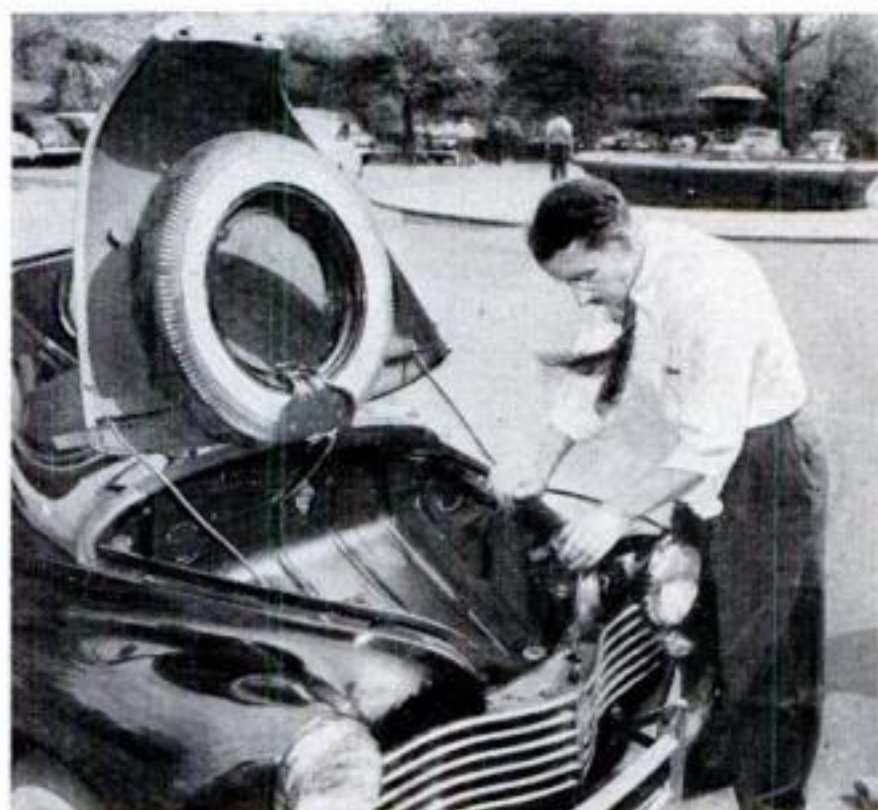
Build a Family Theater: Hodgepodge of TV, radio, and record-player cabinets can be replaced with this neat combination.

Page 174



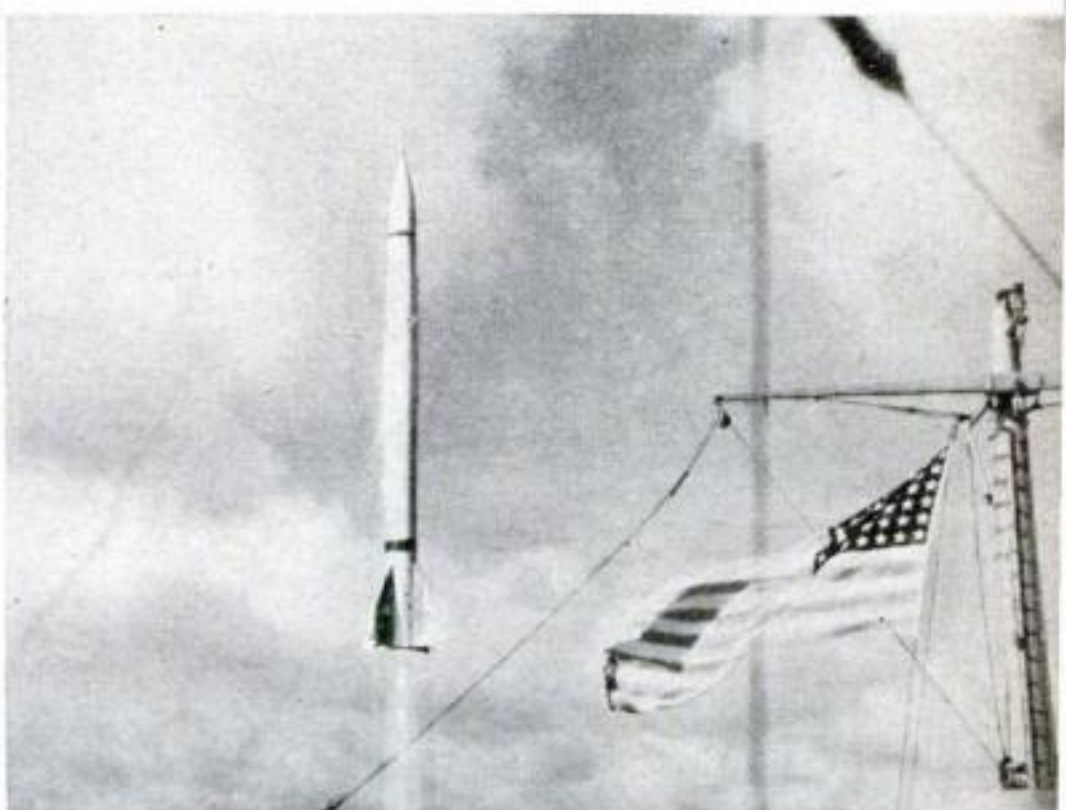
When Your Venetian Blinds Break: Here are easy hints that will take the headache out of repairing those broken slats.

Page 191



Where's the Engine? In this new Renault, it's tucked away in back, but an owner can easily get at it for home servicing.

Page 90



Up Goes the Viking! From mid-Pacific comes an exciting story in words and pictures of how a giant rocket is launched.

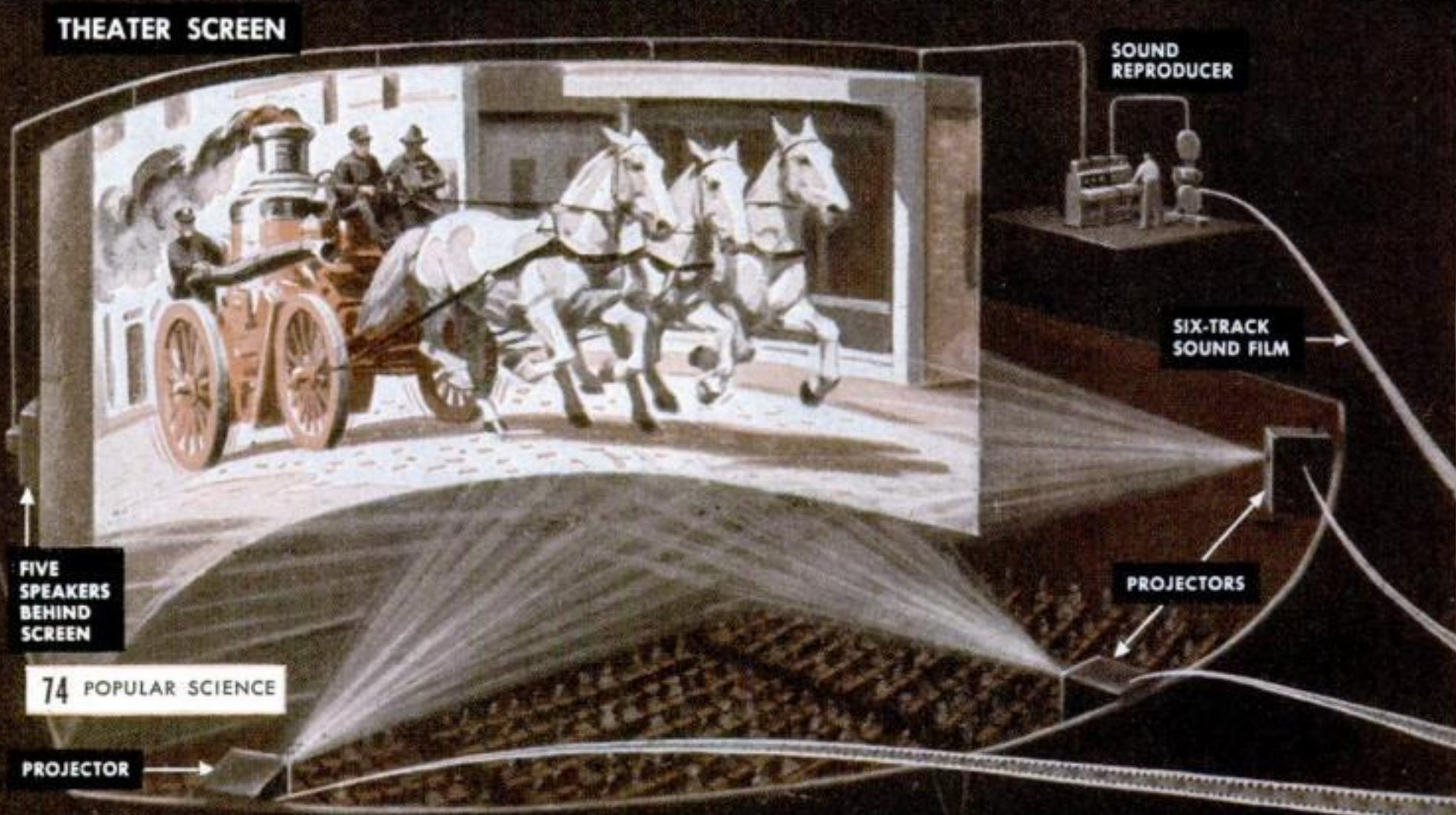
Page 84

AUGUST 1950 73



Spectator gets striking impression he's right in room he sees on big curved screen above. Here inventor Fred Waller and two girl assistants ap-

pear in Cinerama film introducing super-movies at preview in East Norwich, N. Y., demonstration theater. Pictorial diagram below shows how proc-





Cover by Reynold Brown

Super-Movies Put You In the Show

PS takes you behind the scenes where an exciting new technique of film-making is being groomed for its public debut.

By Alden P. Armagnac

PS PHOTOS BY HUBERT LUCKETT

ess transfers action from reality to screen, with aid of three-lens camera and theater system of three projectors.

MOVIE SET

MICROPHONES

SOUND RECORDER

THREE-FILM CAMERA

THRILLS that lift you out of your seat . . . action that goes on right around you . . . these are the illusions created in a new kind of movie.

Panoramic sight and sound put the action right in your lap. Fire engines seem to come right at you. Planes roar over your head. You're not just looking *at* this "wrap-around" movie show—you're in it!

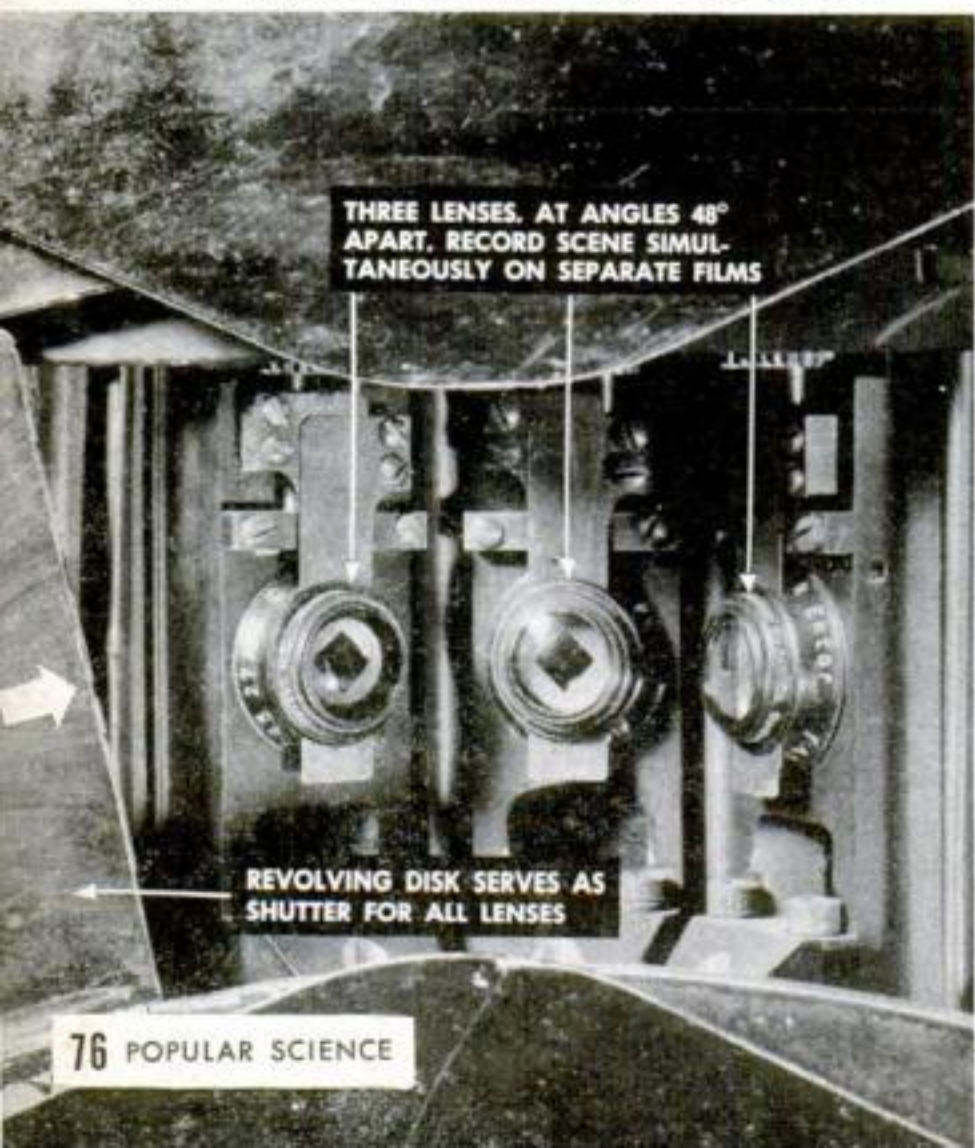
Super-movies produced by the new system, known as Cinerama, may make their public debut late this year or early in 1951. Previews of short Cinerama films have been given movie makers and exhibitors at an East Norwich, N. Y., indoor tennis court converted into a demonstration theater. Negotiations are in progress to make the first full-length super-movies and equip theaters to show them.

So powerful is Cinerama's feeling of reality that when one preview "short" portrayed a ride on an amusement-park roller coaster, several spectators became seasick



CURVED SCREEN has end sections of vertical ribbons, arranged like slats of Venetian blind. This eliminates reflection of light from ends to center of the concave screen, which detracted from clarity of picture there when ordinary screen material was used.

CAMERA OF CINERAMA SYSTEM puts scene on three films, each making up one-third of final picture. Close-up, below, is actual-size view of camera's three lenses. Their lines of sight cross at point just in front of them, where single disk shutter revolves as shown by arrow.



and had to leave hastily. (This reporter stuck it out, hanging on tight to both chair arms.) Super-movies attain this realism by a new departure in methods.

First, they are *not*, nor do they claim to be, stereoscopic or three-dimensional movies. Those require either a special screen that only a limited portion of a normal audience can view from just the right angle, or special spectacles for all viewers, which most movie patrons simply won't be bothered with. No such gadgets are used by Cinerama audiences.

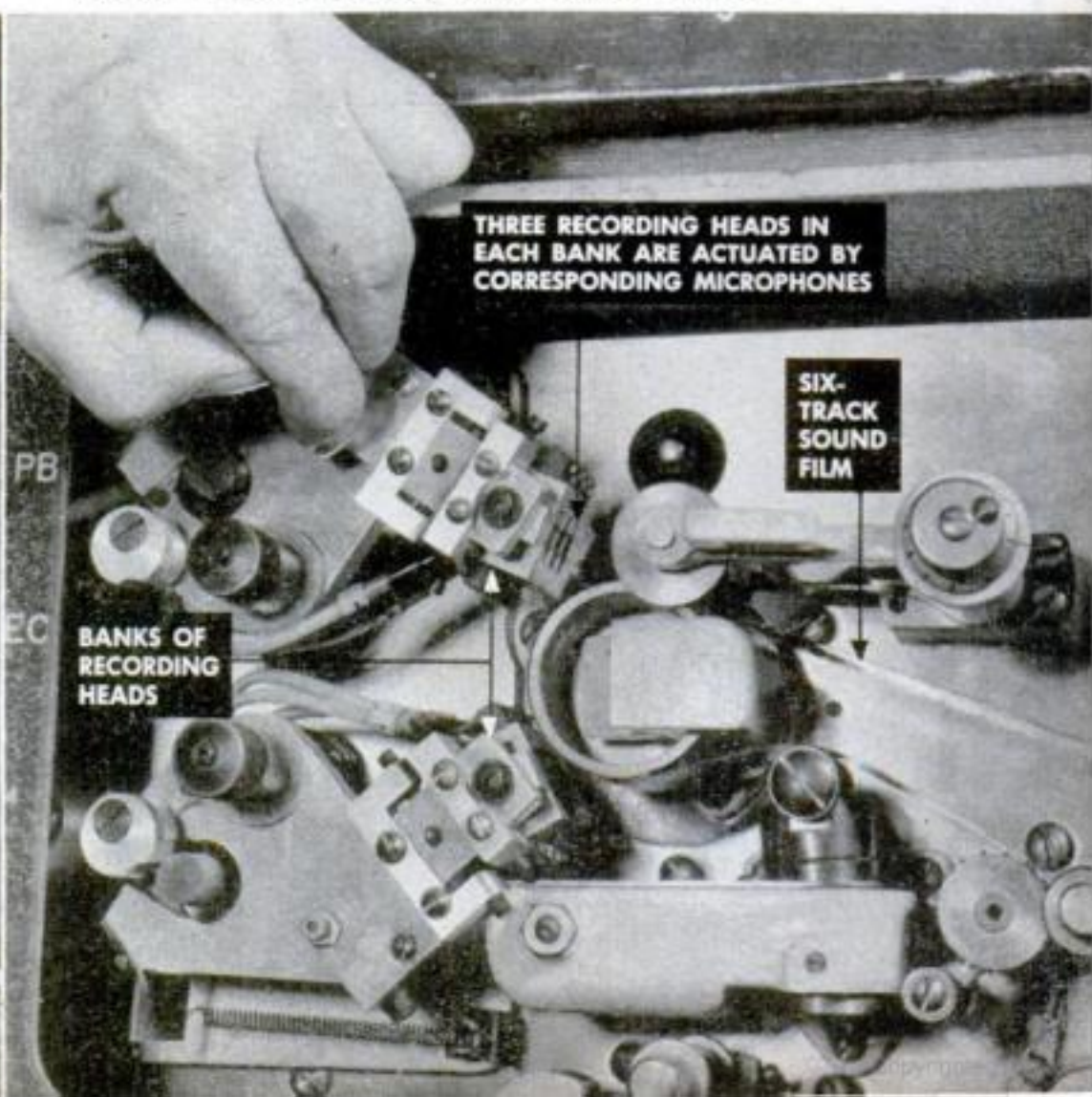
Actually, only a part of the clues that make a scene seem real to you are supplied by binocular, or two-eyed, vision. By skillfully combining others, the Cinerama process gives substantially the same effect.

Just as in real life, you can look all around, as well as straight ahead. Cinerama's big "wrap-around" screen of eight times the standard size—twice as high, and four times as wide—forms a great curving arc across your field of view. It seems to surround you with action taking place on it. That gives you the feeling of being right in the midst of things—instead of outside, looking in.

People in close-ups, on this giant screen, fill your vision. They seem so near that you could reach right out and touch them.

Your impression of seeing the scene through your own eyes, instead of the cam-

SOUND-RECORDING PART of Cinerama system puts everything picked up by six microphones on a single magnetic-type sound film. View of its mechanism, below, shows sound-recording heads, arranged in two banks of three each. Same machine, or similar one, reproduces sound.





FIELD EQUIPMENT for making super-movies, above, consists of Cinerama camera and portable

sound-recording outfit. Latter uses six standard microphones spotted at strategic locations.

era's, is heightened by picture-taking lenses that match the human eye in focal length and give exactly the same perspective.

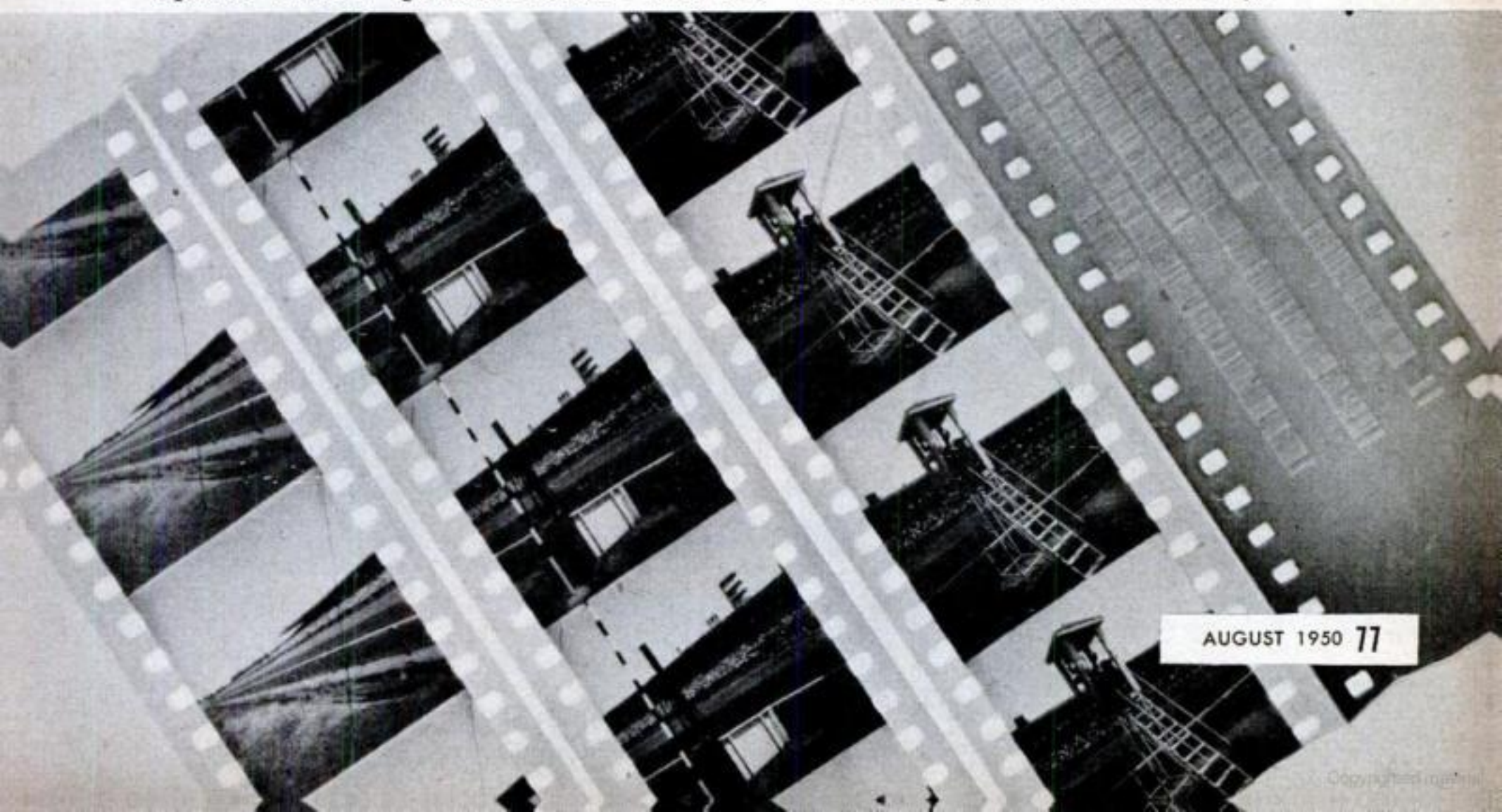
As convincing to your ears as to your eyes is the simulation of reality. Wherever an actor may be on the screen, that is where you hear his voice coming from. From behind you, you first hear the voices of a procession of singers, as they march onto the scene from behind the camera.

PUT THESE FOUR FILMS TOGETHER and you have a Cinerama movie. First three form left-hand, center, and right-hand parts of picture, when projected side by side on theater screen. Dark film at right carries six sound tracks that operate theater's speakers. Picture frames are

Filming and projecting a scene of Cinerama dimensions is no small feat. Almost literally eye-filling, the picture covers a field of vision about 146° wide and $55\frac{1}{2}^{\circ}$ high—not far from the extreme limit, 160° by 75° , of human eyes. No single lens, not even a wide-angle one, can satisfactorily take in more than a fraction of this territory.

So the 150-pound Cinerama camera consists of three cameras in one. Its eyes are

half again standard height. To make them, camera advances standard 35-mm. film six perforations at a time, instead of usual four. Magnetic-type 35-mm. sound film, with opaque coating of iron oxide, needs no laboratory processing and it can be played back immediately.



three matched lenses, of 27-mm. focal length, set at angles 48° apart. Each lens records one-third of the total width of the scene, upon one of three standard 35-mm. films carried in as many film magazines. Otherwise, the three sections operate as one. Lines of sight of the three lenses converge and cross at a point $11/16$ of an inch in front of them, where a single revolving-disk shutter serves them all, assuring synchronization of exposures. One knob simultaneously focuses all three lenses. Another knob controls diaphragm settings in unison.

Individual Cinerama frames are half again standard height. Since three strips are used, the total amount of picture film used is $4\frac{1}{2}$ times as much as for a standard movie.

After the camera has dissected the scene into three parts, it remains for the theater's projection system to put the parts together again. This requires three projection booths instead of the customary single one. Installation of these booths and of the large curved screen will adapt existing theaters to show Cinerama films.

Projectors' Angles Match Cameras'

From angles like those of the camera lenses, the theater projectors throw the three sections of the picture side by side on the screen. The center section of the screen is curved, usually on a 25-foot radius, and two flat wings are tangential to this curve. The depth of focus of the projecting lenses is great enough so that the curvature of the screen presents no problem.

An innovation in each projector is a mechanical device nicknamed a "gigolo," because it jiggles up and down. Just as a photographer makes a vignette, this mask with a saw-tooth edge moves along the border of a film, so that the picture gradually fades from view at its edge. Thus adjoining films blend together on the screen without a conspicuous dividing line.

For realistic sound effects, six microphones in the field make individual tracks on a single 35-mm. sound film used for this purpose alone. Theater speakers, arranged in the same pattern as the microphones, are individually operated by the sound tracks. This produces the striking "sound-perspective" illusion that makes voices and music come from the right directions. A favored technique places five microphones and speakers, respectively, in a row across the full width of the movie set and the theater screen. The sixth microphone is put some

distance behind the camera and picks up "off-stage" sounds, reproduced in the theater by a speaker at the rear of the audience.

Recent strides in magnetic recording have led to the choice of magnetic-type sound film, which needs no laboratory processing and can be played back at once.

Like conventional movies in their infancy, the preview films are not entirely free of technical faults; for example, straight lines are distorted by certain camera angles, which must be avoided. As the sponsors point out, these are experimental films, which will be bettered as the possibilities and limitations of the novel technique are more fully explored.

Super-movies are the invention of Fred Waller, former Paramount Pictures executive, and designer of the Waller Gunnery Trainer (PS, Sept., '43, p. 65). His experiments with Cinerama began in 1938. War interrupted its development for entertainment, but it was incorporated in Waller's trainer. This used a five-lens camera and five projectors to portray airplanes realistically on a curved screen as Air Force practice targets. Since the war, he has developed the simpler three-lens process.

Will theaters adopt super-movies to offer their patrons new thrills in entertainment? Facing the growing competition of television, the movie industry has been seeking a way to meet the challenge. Cinerama's sponsors believe they have the answer. **END**

Shoptalk:



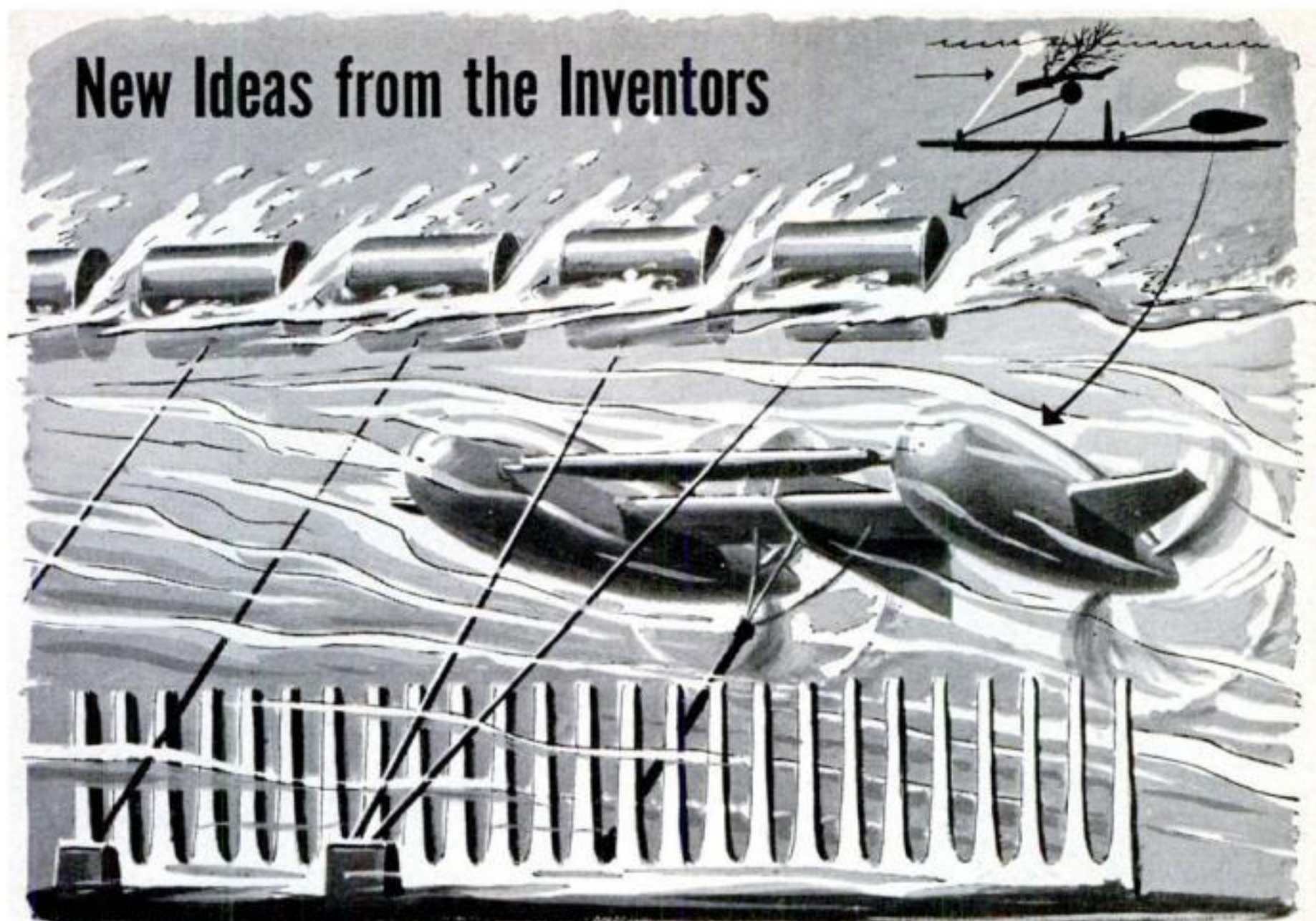
**"I ALWAYS USE A
SPEAKER ON RAGCHEWS,
BUT CANS ARE THE
ONLY THING FOR STICK
OR MILL COPY."**

What are they talking about?

Answer below.

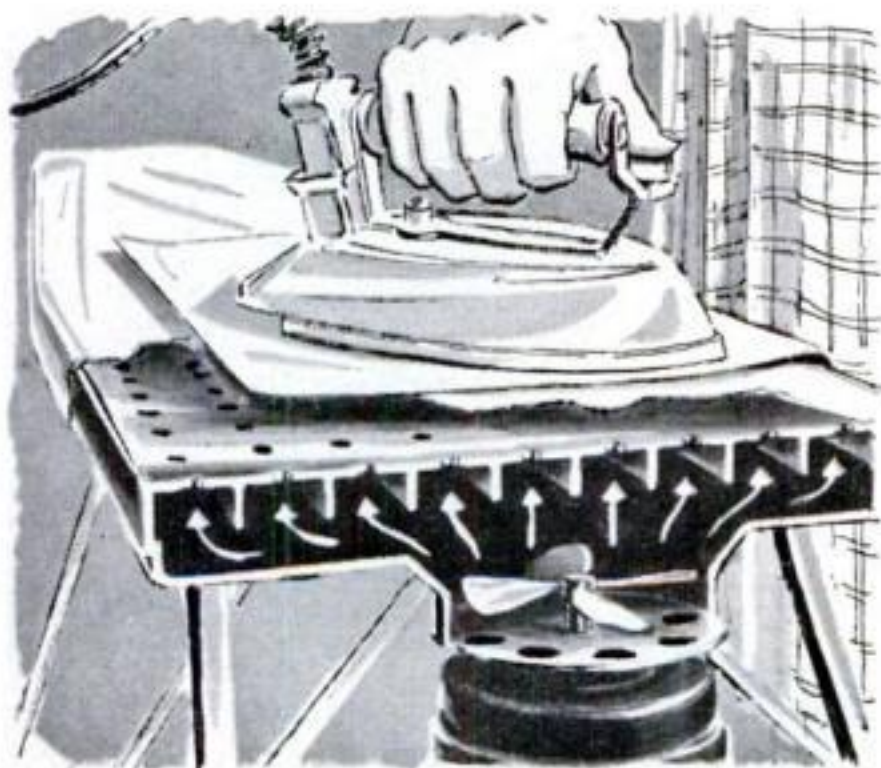
They're amateur radio operators. He's telling his buddy that he uses a loudspeaker on his short-wave receiver for general conversation, but that earphones are the only thing when writing down messages with a pencil (stick) or typewriter (mill).

New Ideas from the Inventors



1 Stream Turbines Give Power. This underwater power plant for use in fast-running rivers resembles twin torpedoes joined by wings. The tail propellers, spun by the flow of water, drive electric genera-

tors inside. When floating debris or ice strikes protective floats anchored upstream, a control system folds the props and tilts the wing, causing the unit to dive behind a guard rake until the debris passes.

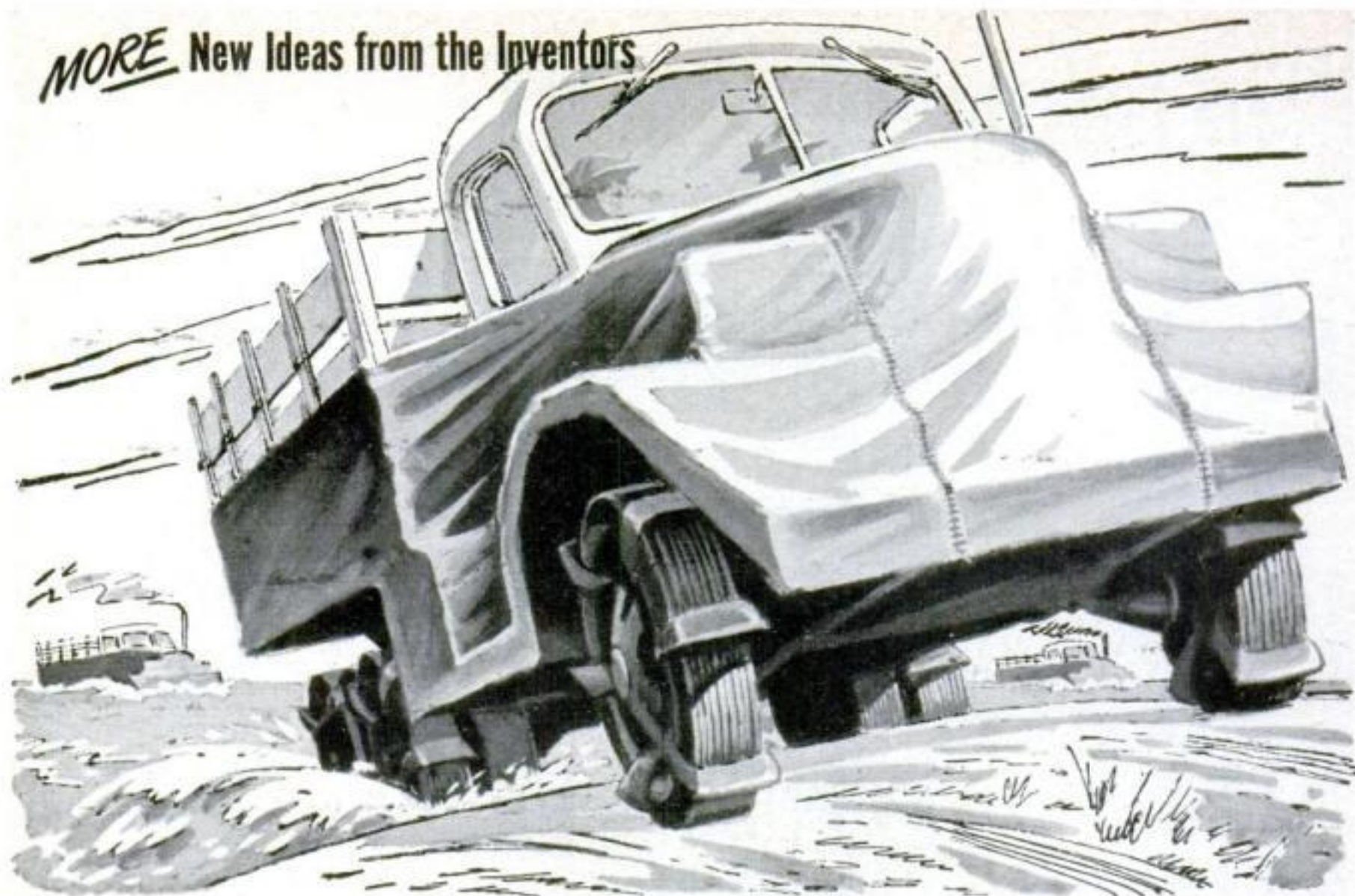


2 Air Flow to Speed Ironing. A small electric fan and ventilating system are built into an ironing board to provide a continuous flow of air up through the pad and cover. This, the inventor explains, not only helps keep the pad dry, but also assists the iron in removing the moisture from the fabric being pressed.



3 Roll Painter Has Own Feed. A feed roll, dipping into a storage well, transfers the paint to the applicator roll in the latest roll painter. Thanks to a gravity-operated axle mount, the feed roll moves away from applicator when the handle is held vertical. This stops paint flow so applied paint can be worked in.

MORE New Ideas from the Inventors

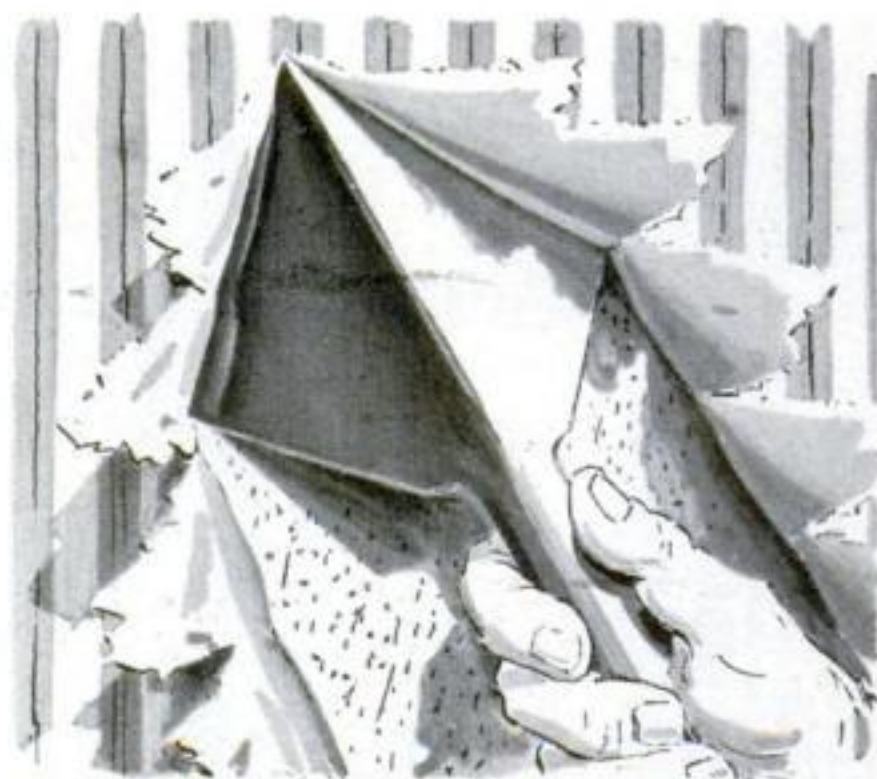


4 Cover Makes Truck a Duck. A truck or a car can be transformed quickly into an amphibious "duck" with a form-fitting zip-on cover designed to make the entire lower portion of the vehicle waterproof. The cov-

er, completely encasing the chassis and hood, is fastened around the axles with waterproof metal clamps. Cup-shaped fins, strapped around the tires, provide for propulsion in the water.



5 Child's Tray Fits Counter. Feeding a youngster at a soda or lunch counter would be no problem with this tray. Its forward end rests on the edge of the counter, while U-shaped slots in the ends of the two side members fit around the two up-rights that support the back of the stool, holding the tray firmly in place.

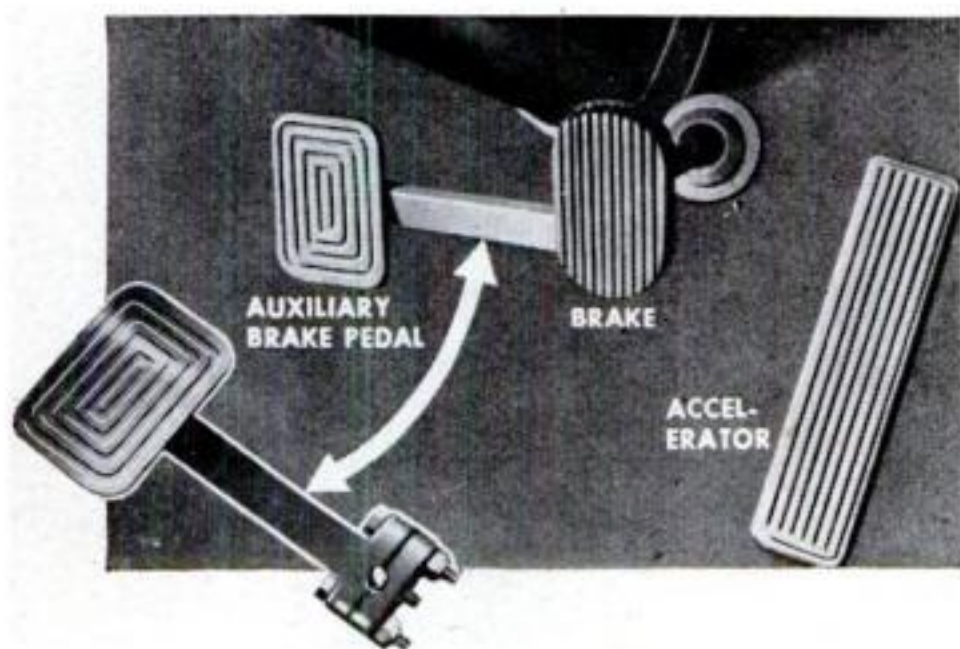


6 Cutter to Remove Wallpaper. Acting like a snowplow, the V-shaped, twin-edge cutter shown is designed to simplify the job of peeling off old wallpaper. Because it comes to a point, the cutter can be started into the paper easily, and when pushed forward the V-shaped edges turn the paper back out of the way.

Patents on these inventions have been granted to: 1. E. Souczek, Vienna, Austria; 2. L. Mueller, Milwaukee; 3. B. Dean, Pittsburgh; 4. A. Benson, Hopewell, N. J.; 5. G. Stanton, Worcester, Mass.; 6. A. Singer, Los Angeles.

You See Your Party On New Video Phone

JUST as imaginative writers have forecast for years, you can now see the person you're telephoning—if you're in a television phone booth developed by the U. S. Army Signal Corps at Fort Monmouth, N. J. At right, Corporal James J. Rhoads demonstrates how it might end blind dates. As he converses with Wac Pfc. Dorothy J. Burrus, he can watch her on the television screen. For sterner military purposes, the two-way video phone transmits tactical maps, charts, reconnaissance photos, and other important pictorial information. Voices travel by customary telephone connections, and picture images by coaxial cable. The lens of the television camera is visible below the screen. It picks up either the face of the speaker or pictorial matter held before it. Booth is equipped with built-in lamps for video illumination.



Extra Pedal Aids Driver

AN AUXILIARY pedal (above), attached to the brake of a car with an automatic transmission, makes it easier for your left foot to operate the brake while the right one remains on the accelerator. Its use is said to stop car creeping, facilitate parking, prevent stalling, make it easier to put the car in reverse, and start the car on an upgrade, after a full stop, without rolling backward. The device is the product of the Hold-N-Bar Co., Detroit, Mich.



Pen Writes in the Dark

WRITING in poor light is simplified for physicians and reporters by a fountain pen with a built-in flashlight—a new version of a combination attempted with varying success in earlier designs. Introduced in Germany, the latest type offers a ball-point pen with a translucent-plastic writing end, illuminated by a tiny bulb concealed within. The battery of the pen has a life sufficient to power the writing spotlight for three hours of continuous use.



WILBUR SHAW Reports the New Cars From the Driver's Seat

America's best-known man behind the wheel to give Popular Science readers his impressions of what's new and interesting in automobiles.

By Perry Githens *Editor, Popular Science*

INDIANAPOLIS SPEEDWAY — Wilbur Shaw, three-time winner of the famous 500 and head man of the Indianapolis Speedway, will do a new kind of mobile report for this magazine.

Equipped with lip-microphone and tape recorder, Shaw will "interview" the new cars *while he drives them*. He'll talk the cars through traffic, along country roads, and around the track of the champions he knows so well. In what is literally a running commentary, he will give his personal impressions of how the cars handle under various conditions.

Probably nobody is better qualified to talk about automobiles than Wilbur Shaw. He has lived with them since he was an Indianapolis kid who grew up in the Speedway.

He cleaned parts, built cars, and "raced dirt" for years before he got his chance in the Big Race. Then it took ten more years before he won the 500 the first time.

Like so many racing drivers or jet pilots or submarine skippers you meet, Shaw looks the part. He has the deep lines, creased out from the eyes, that men get who have looked often at danger. Standing still, you might take him for any lean, graying young executive who gets in a lot of golf—which he does. But when Shaw moves, he shows the smooth coordination of a fast man with a pistol—which he is. He is also pretty good with airplanes, speed boats, and fishing rods.

Talk with Shaw about automobiles, and you sense his affection for everything that moves on wheels and makes a noise. Ride with Shaw, as I did, and you know his respect for the machine, the passenger, and the public.

When I settled myself in the front seat of the Mercury that had been the pace car in the race this year, I knew I could relax. Shaw is the kind of driver who would no more wrench a car with excessive acceleration than he would kick a child. Inching through Indianapolis traffic or rolling proudly around the empty Speedway, I enjoyed the scenery.

Shaw is as much of a champion for safety as he is for speed. He hates show-offs—on

the road or on the Speedway. He thinks good driving is more a matter of personal attitude than of rules.

"A man steps into an elevator," says Shaw, "takes off his hat, politely bows a lady through the door and into her car. Then he climbs into his own car and starts blowing the horn if she doesn't get going—that's what I mean by attitude."

As an airplane pilot, Shaw's passion for quick propulsion has piled up a lot of hours in his logbook. But he also likes to ride trains, and he keeps a couple of motorcycles around for sparetime amusement. His idea of real fun, however, is to take a spin in a new car—preferably clear across the country.

Once in a while he borrows a helmet and old shoes to wheel a car around the Speedway, just to see what he can coax out of somebody's latest combination of motor and chassis. But his own helmet will stay on the shelf in his nice big office except for one little ambition: he'd like to crack the world's speed record out on the Utah salt flats.

Shaw thinks that cars are like guns—they're all good but some are better. Every make of automobile or kind of springs and drives has its enthusiasts, and they all like to talk shop. Now they have a chance to listen to America's Number One driver—who is also a fellow reader of POPULAR SCIENCE. **END**



OLD TIMER, NEW WINNER—Wilbur Shaw, President of the Indianapolis Motor Speedway and

three-time winner himself, greets Johnny Parsons, winner of the 1950 race, at the finish line.

Ship-Launched Rocket Zooms 106 Miles Up

Mid-Pacific experiment foreshadows the day when our Navy may add huge guided missiles to its seagoing striking power.

By Warren Hughes

ABOARD U.S.S. *Norton Sound*
NEAR JARVIS ISLAND, MID-PACIFIC

DURING the hushed waiting you see Viking Four, that latest and most advanced of the Navy's high-altitude rockets, standing quietly on the *Norton Sound's* fantail. A gleaming white under the equatorial sun, it seems lifeless, like a massive finger pointing the direction of its imminent flight.

But already cosmic-ray, pressure-measuring, and telemetering instruments mounted in the nose cone of the 49½-foot rocket are clicking away. And you know that in a few moments the rocket, fueled and poised, will take its first breath of fire and will spit roaring flames to boost itself into the ionosphere.

The controller's voice drones on, marking

the count down of final seconds. The tension mounts. Even veteran missile men involuntarily hold their breath.

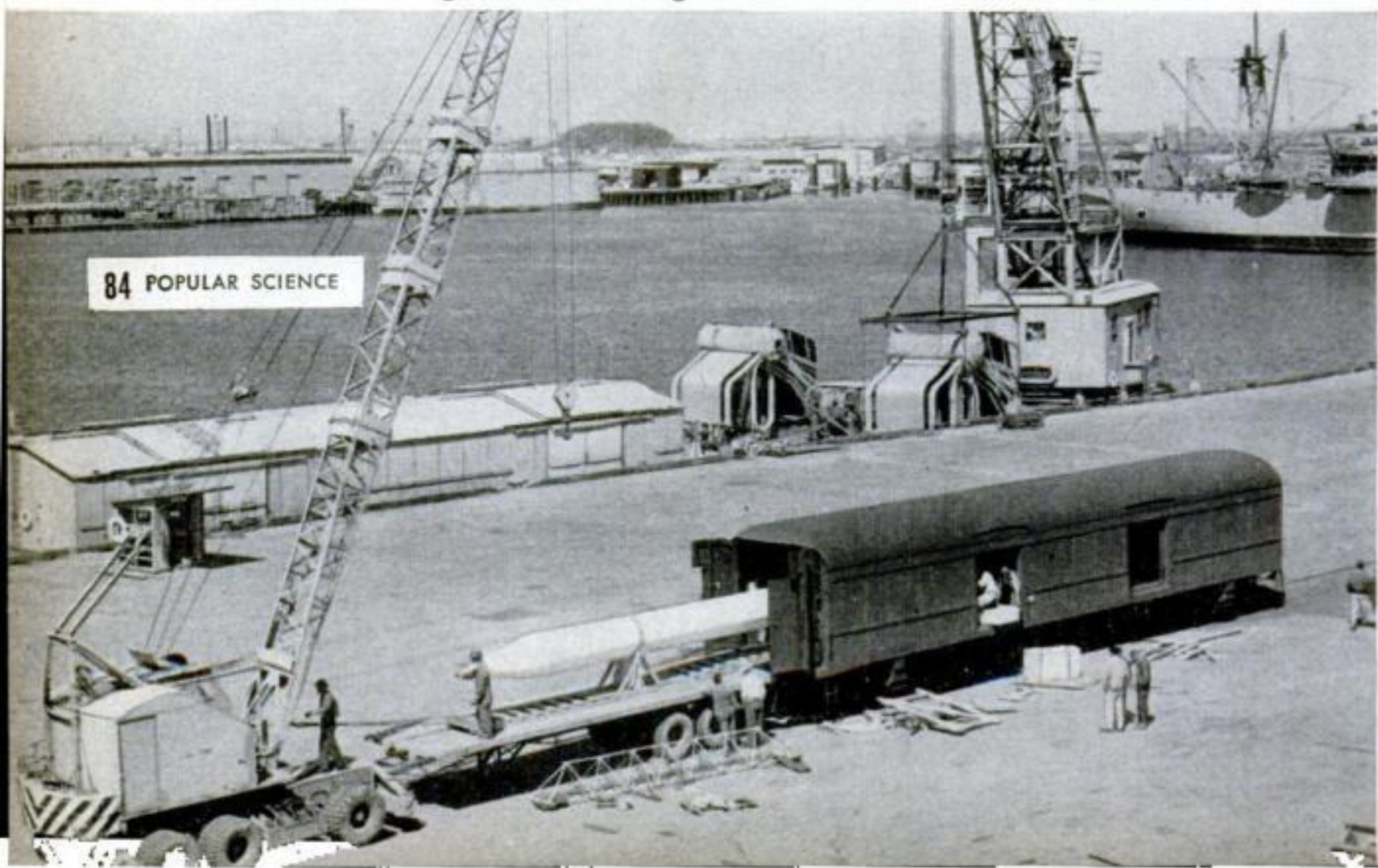
During the last three seconds not even the controller's voice is heard. Firing personnel correct for the ship's roll, pitch, and yaw to obtain absolute stability in the rocket. Then, with all conditions controlled, the firing button goes down.

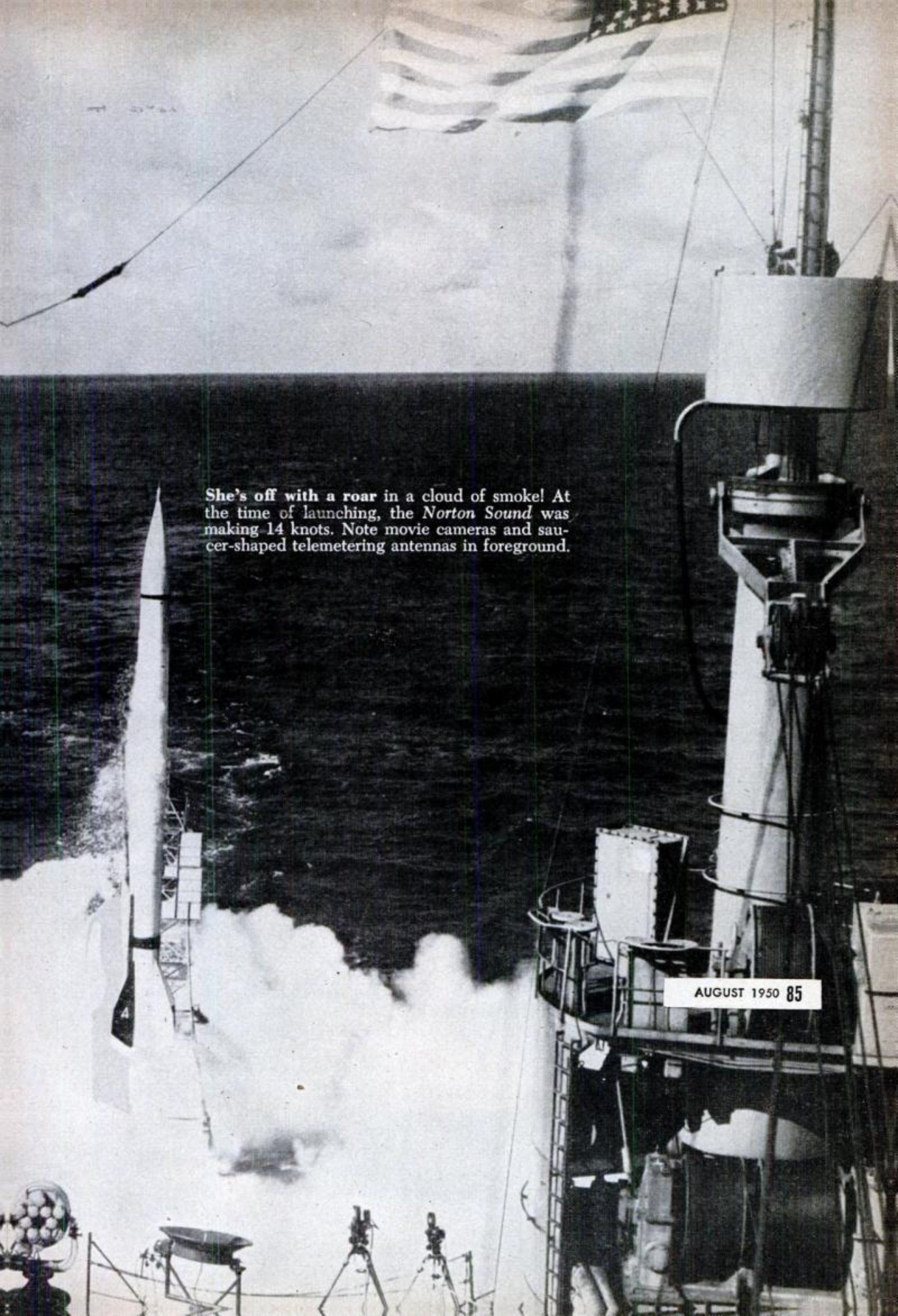
The spring-operated boom breaks its contact with rocket instrumentation. The rocket begins to take on life. Immediately a manganese compound catalyst mixes with powerful hydrogen peroxide, setting off a violent reaction, operating a turbine to pump propellants into the rocket motor. Simultaneously a pyrotechnic flare inside the rocket ignites the fuel mixture. The high-temperature steel alloy of the motor's interior turns cherry red like a depot stove in midwinter: it is even shaped like a squat, potbellied railroad heater. But there the resemblance ends, for it withstands 5,000° F.

The end of a journey and the beginning of another for the slender Viking Four as it emerges

from a railroad car at Port Hueneme, Calif., for transfer aboard the U.S.S. *Norton Sound*.

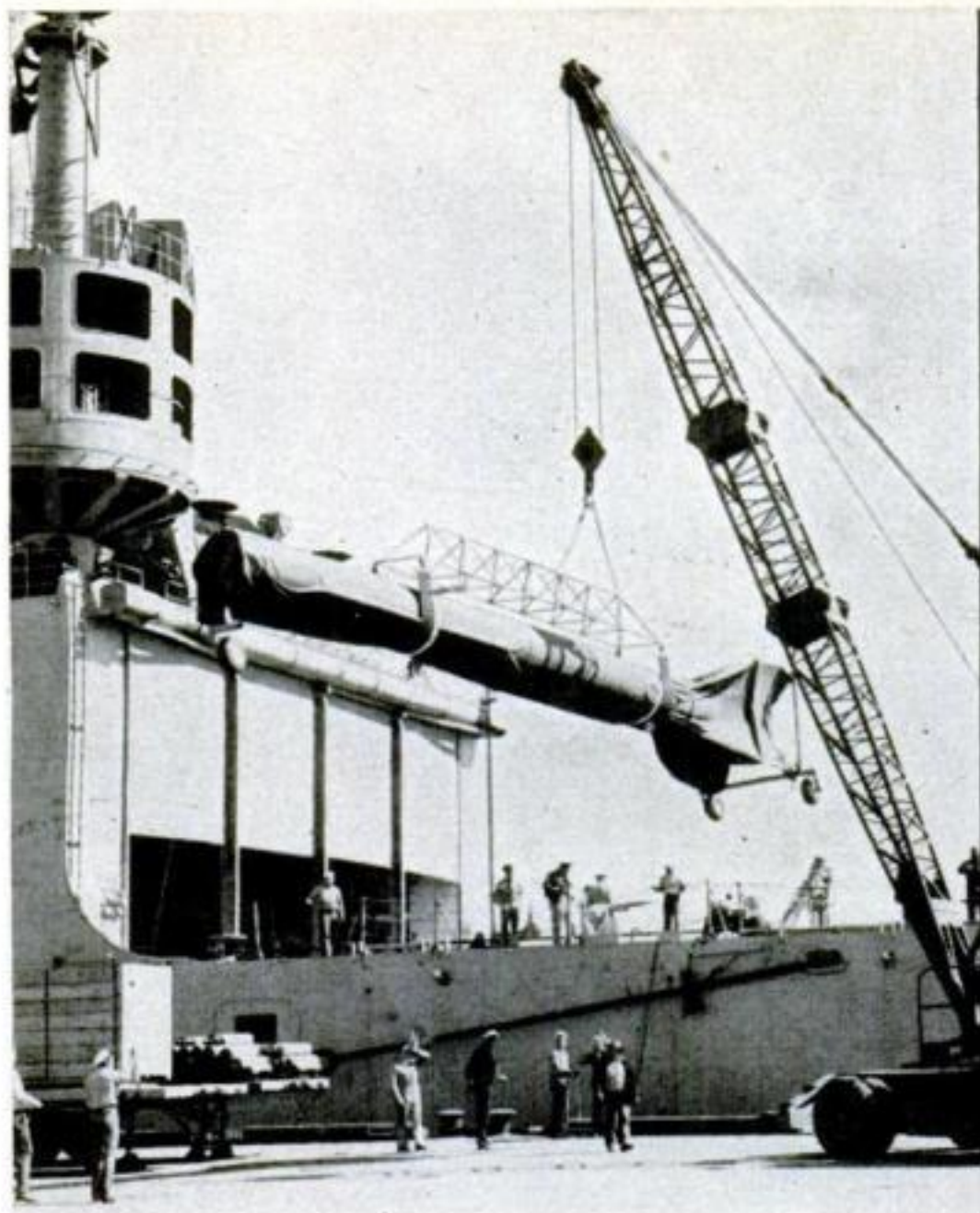
84 POPULAR SCIENCE



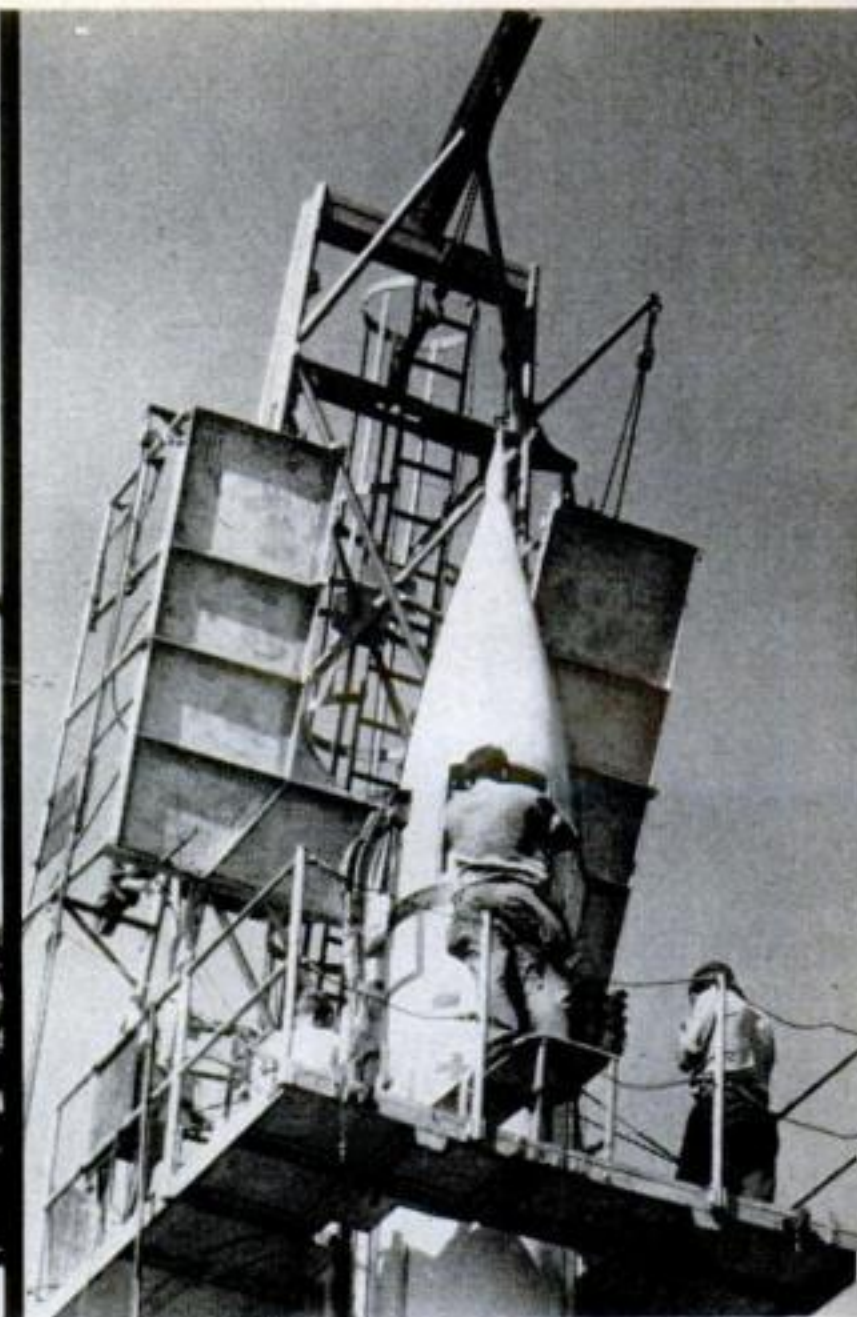


She's off with a roar in a cloud of smoke! At the time of launching, the *Norton Sound* was making 14 knots. Note movie cameras and saucer-shaped telemetering antennas in foreground.

AUGUST 1950 85



Glad to have you aboard, Sir! The Viking rocket is swung onto the launching deck. During the voyage, it was housed in hangar deck at left, which also served as technicians' workroom.



On servicing tower, almost 50 feet above deck, experts work on the rocket's instrumentation section. More than 300 vacuum tubes were used for gathering and transmitting scientific data.

heat as it shoots forth a roaring stream of fire. Its kick is 20,000 pounds of thrust—straight up.

The rocket starts climbing slowly, as if reluctant to leave the ship. Then it seems to make up its mind, gathers speed and flashes skyward. If you want to follow its flight you have to lie on your back, for the fire-spitting Viking streaks overhead like a fast-moving white needle trailing an orange-blue thread. Zooming through the clouds, its nose heats up to a searing 500° F.

At 10 miles or so the rocket begins making a white vapor trail against the blue overhead. The vapor trail stops at about 20 miles above sea level as the rocket leaves the dense atmosphere. If you have sharp eyes you might see the rocket's fiery jet overhead, tiny against the sky, like a distant star. Then it disappears into space and you wonder how far it will go.

Below, the ship's tracking radars follow the flight. Flash-timing throughout the ship synchronizes cameras grinding away on recording devices. All voice circuits, too, are

recorded on special sound tracks. Plotting rooms bustle with charting operations. Saucer-shaped telemetering antennas are gleaning scientific and operational information from the rocket itself.

Released from the dense atmosphere, the Viking rips skyward at 3,500 miles an hour—almost a mile a second—before all fuel is consumed. Burnout occurs at about 75 seconds. The Viking keeps on climbing.

Booting into the ionosphere, the rocket scrapes the gates of outer space and hits 106.4 miles, more than doubling previous records of the Viking rockets. Then it starts down. There are two splashes seven miles astern and you hear the thunder of shock waves generated when the Viking re-entered the atmosphere. Less than 10 minutes have passed since the rocket roared off the *Norton Sound's* launching deck.

During that 10 minutes the Viking shattered records. It went higher than any previous American designed and built single-stage rocket. It was the most spectacular and successful rocket firing from a ship

under way at sea. And it confirmed the theory that ships can provide mobile platforms that extend the range of guided missiles far beyond limits imposed by land-based launchings.

But how was this record-breaking rocket handled and fired? What new developments and techniques make it one of the outstanding accomplishments of the year?

It is not simple, even ashore, to launch a huge missile fueled by liquid oxygen and alcohol. At sea, it is more complicated. The unprecedented flight was made possible by design improvements of the rocket itself and highly developed skill on the part of missile men—that new brand of pioneers who launch, control, and track fire-snorting rockets and missiles.

Viking Four, produced by Glenn L. Martin Company and powered by Reaction Motors, made its record flight despite carrying more than 900 pounds, the heaviest payload of any Viking. It had more than six cubic feet of added payload space below its pressurized nose cone. In addition, the body of the nearly 50-foot pencil-like Viking's tail section was structurally strengthened to withstand the stress of launching from the deck of a rolling, pitching ship. Electrical circuits were housed outside the rocket's body, and extra propellant space compensated for the aerodynamic drag of outside ducts. These propellants, used after the

rocket had achieved ultrasonic speed, gave added boost.

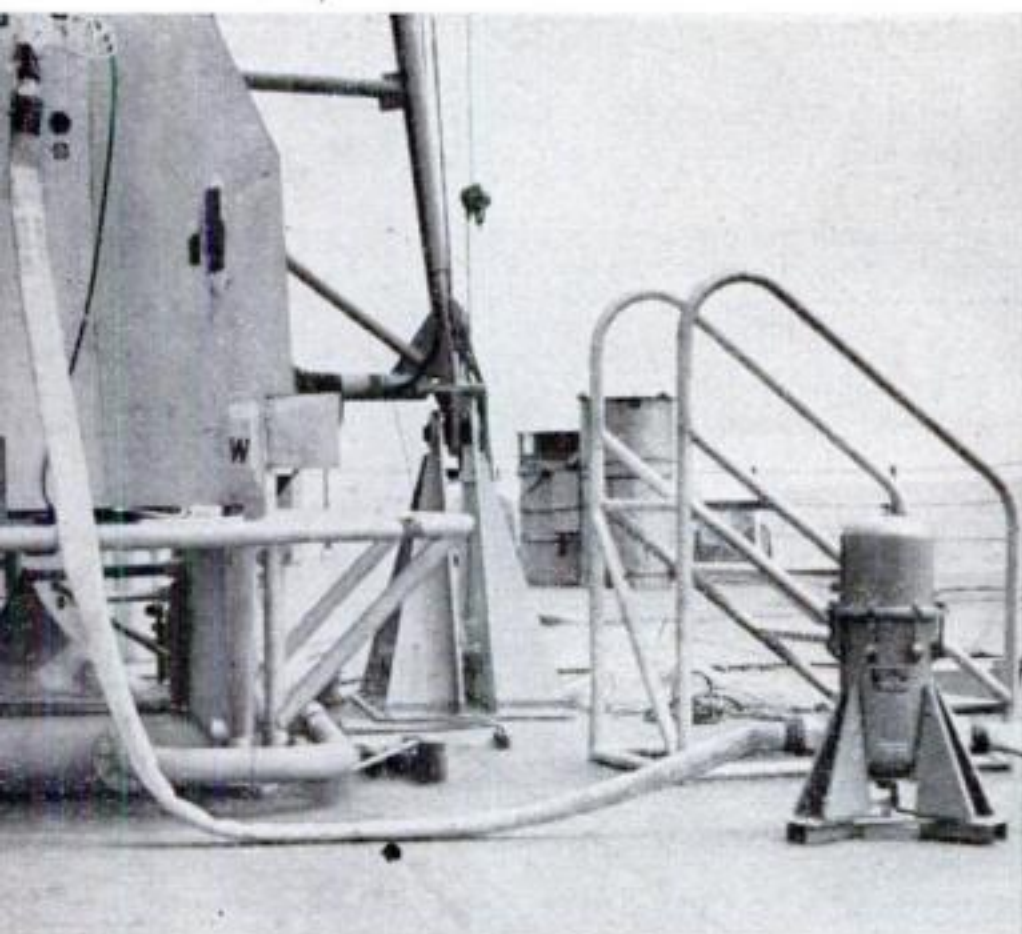
Oxygen tanks were built directly into the skin of the Viking, saving about 40 pounds of weight and gaining oxygen space, both important factors of rocket design. Other rockets have had separate insulated tanks.

Because aluminum is stronger under conditions of intense cold, the liquid-oxygen tank could be more lightly built than the alcohol tank, another weight-saving trick. Designers also saved pounds by tapering the outer skin of the oxygen tank in accordance with the distribution of the flight load.

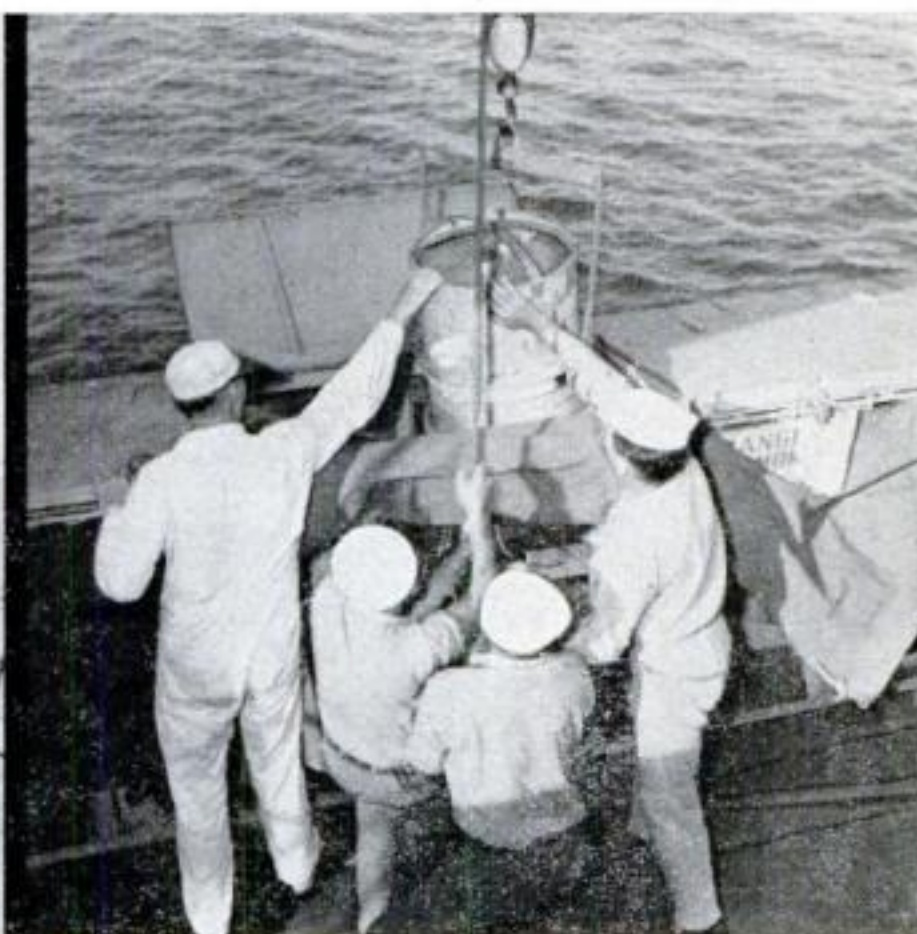
For launching the giant rocket from a wave-tossed ship, a special upright launching system was designed. During land-based launching the rocket stands on its tail fins without added support. The *Norton Sound's* frictionless launching device kept the Viking upright during preparations.

Although the *Norton Sound's* afterdeck is strengthened and insulated against the terrific heat generated in guided-missile and rocket launching, Viking Four called for even more protection for the ship. A new flared pyramid deflected the rocket tail's violent orange-blue-red jet from the ship's deck on take-off. A stream of water sprayed inside the steel pyramid while four streams cooled its seared outside.

Special remote-control fire monitors were ready to serve as robot firemen in case of



The mighty Viking gets ready to drink a heady highball. The alcohol hose has been scrupulously cleaned, and the fuel passes through filter at lower right to eliminate impurities.



Hydrogen peroxide, another ingredient for the drink that will give the rocket its boost, is unstable, and handled with care. Pull of a pin can dump the ship's supply overboard in a hurry.

fire around the rocket. Missile men were particularly careful in handling highly combustible rocket propellants. The hydrogen peroxide—far stronger than any you might buy in a drugstore—could have been dumped overboard simply by pulling a pin.

Liquid oxygen was stowed below decks in giant, insulated, spherical containers. Capable of maintaining oxygen in a liquid state at -290°F or less, they are the world's largest seagoing Thermos bottles.

The missile men used a strange service station—a special tower framework with movable working platforms—for rocket fueling in final preparations. When final tests and fueling were completed, they lowered the tower to the deck clear of the rocket.

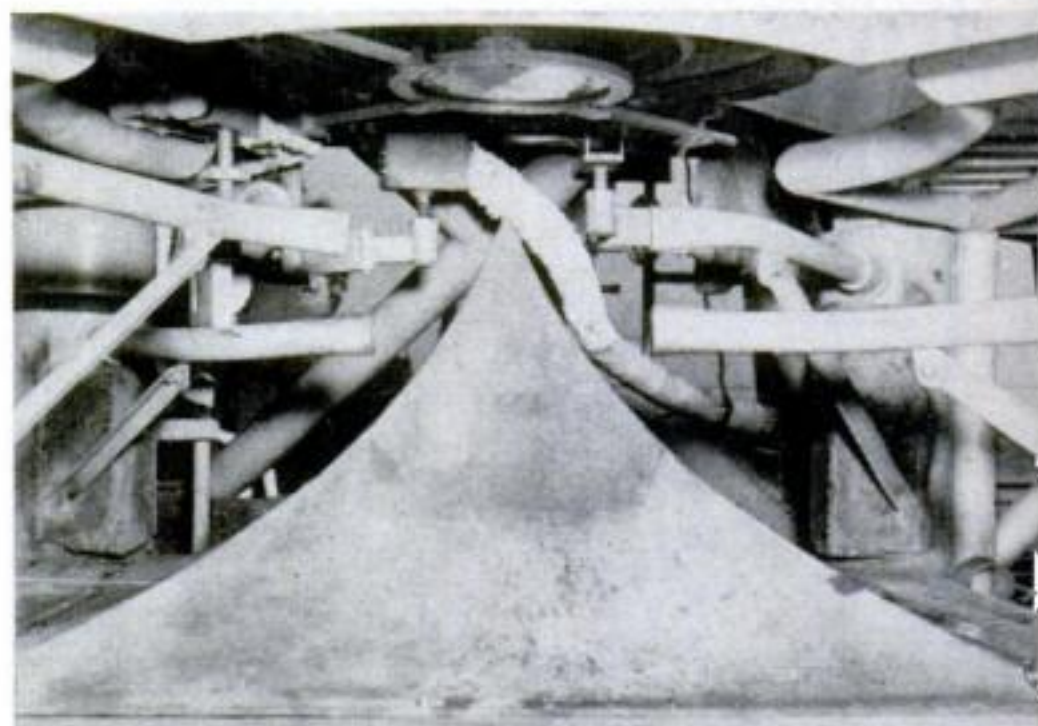
The tower also served as a lifting boom. The rocket was wheeled into position on a Barr cart, a special three-wheeled rocket vehicle. Heaved upward, the Viking rose into position nose first, and as the front wheel of the tricycle came off, the rocket's tail section continued to ride the rear wheels of the cart. Finally brought fully upright, the rocket was secured, missile men removed rear wheels, and the rocket was ready for servicing.

The rocket was kept sealed to avoid dampness and impurities. All electrical circuits were waterproofed again just before firing to avoid trouble from vaporization during flight. A rubberized "raincoat" kept off salt spray and rain.

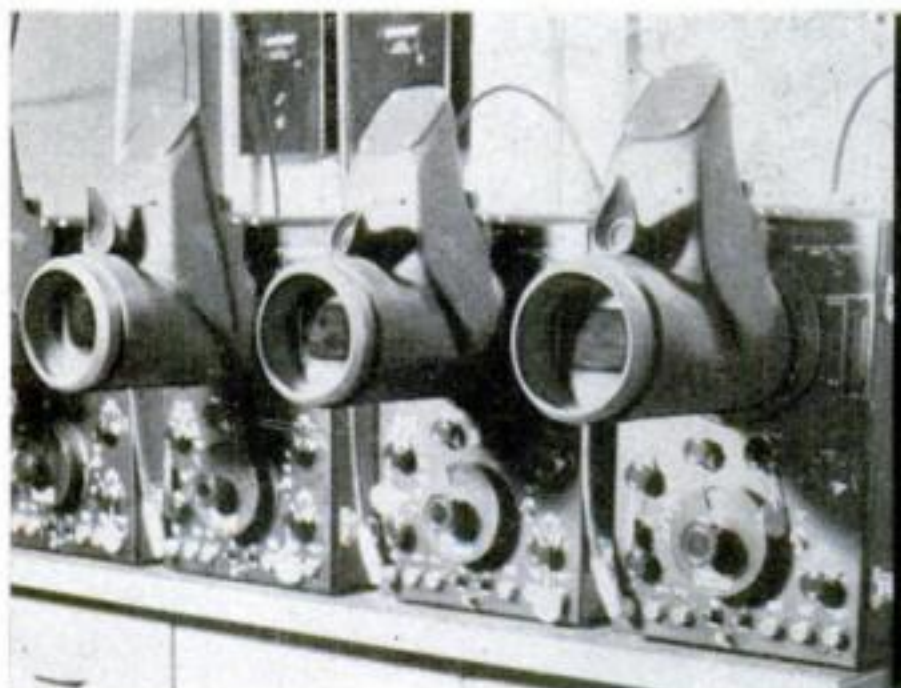
No baby ever got more tender care than a mammoth Viking gets from missile men—and what a baby! When her lusty voice roars, Papa can't help listening. END



Robot firemen give the launching deck a trial spray as the *Norton Sound*, the Navy's experimental guided-missile ship, speeds toward the firing site on the equator, near Christmas Island.



Rocket's hot blast would have been too much for even insulated deck of ship. Water-cooled pyramid above deflected tail jet on firing, created steam clouds seen in photo on page 85.



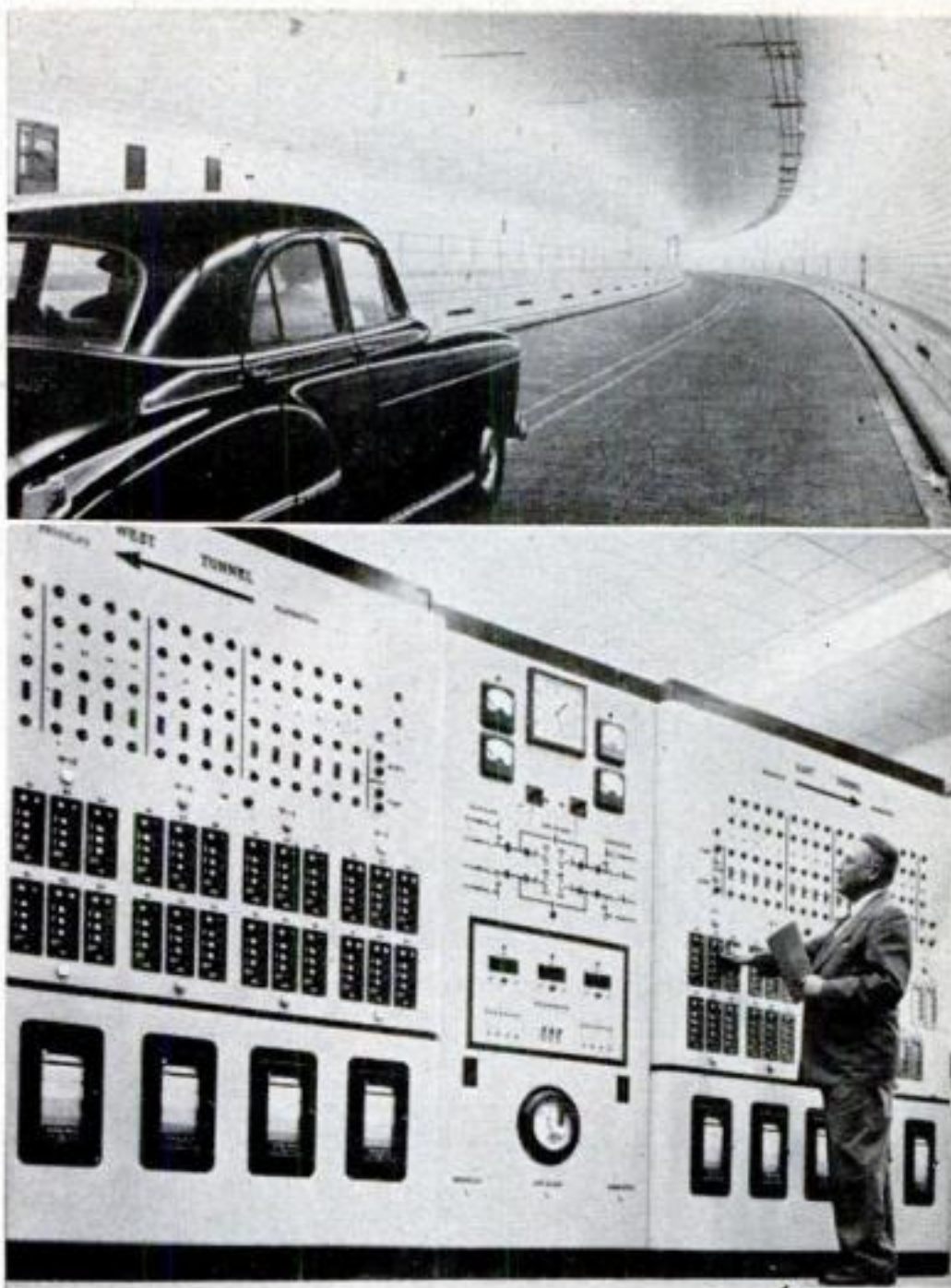
Camera adapters, mounted on telemetering oscilloscopes, made a full pictorial record of the Viking's coded messages transmitted during its more-than-100-mile-flight into the ionosphere.



When big moment came, this push button in the control room triggered the rocket-firing mechanism. When it is pushed for next launching, Navy expects rocket to go twice as high.

Luminous Ribbons Light New Tunnel

EXTENDING almost two miles, four luminous ribbons form the world's longest continuous lighting system, in New York's newly opened Brooklyn-Battery Tunnel. Pyrex pipes containing 5,776 individual fluorescent lamps provide glareless illumination, as seen in upper view at right. Longest under water of all vehicular tunnels, and second longest from portal to portal, the new 9,117-foot twin-tube tunnel employs more than 1,700 miles of wire in its GE-installed electrical system. Operators at its main control panel (lower view, right) watch carbon monoxide indicators and regulate ventilating fans or vehicle flow accordingly. Electrical equipment includes photo-electric height gauges, at tunnel entrances, that sound an alarm and turn traffic lights red against vehicles too tall to pass safely through.



Service Station Rolls to Work

A LUBRICATING truck built by a Sedalia, Mo., construction company has solved the problem of servicing its fast-moving, heavy-duty machinery out on the job. Hoses on reels, as seen above, supply oil and grease from 55-gallon drums and air from a pressure tank. A compressor driven by a power take-off provides the air pressure. The mobile service station also supplies water, from a valve just behind the cab.



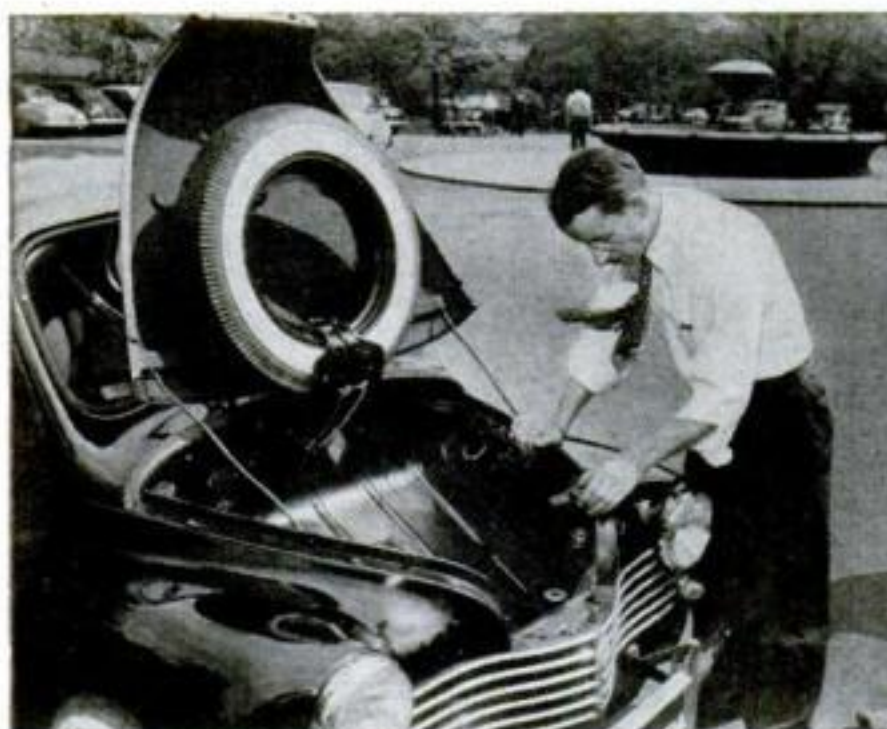
Repair Pad Guards Fender

SHINY fenders won't be marred by car tools when they're protected by a cover called the Mechanic's Pal, above, for use in repair garages or by the car owner who does his own tinkering. A foam-rubber base keeps the pad from slipping off a fender, and forms a cushion on which tools may be laid. The wear-resistant vinyl fabric is reported proof against gasoline, grease, water, and acid.

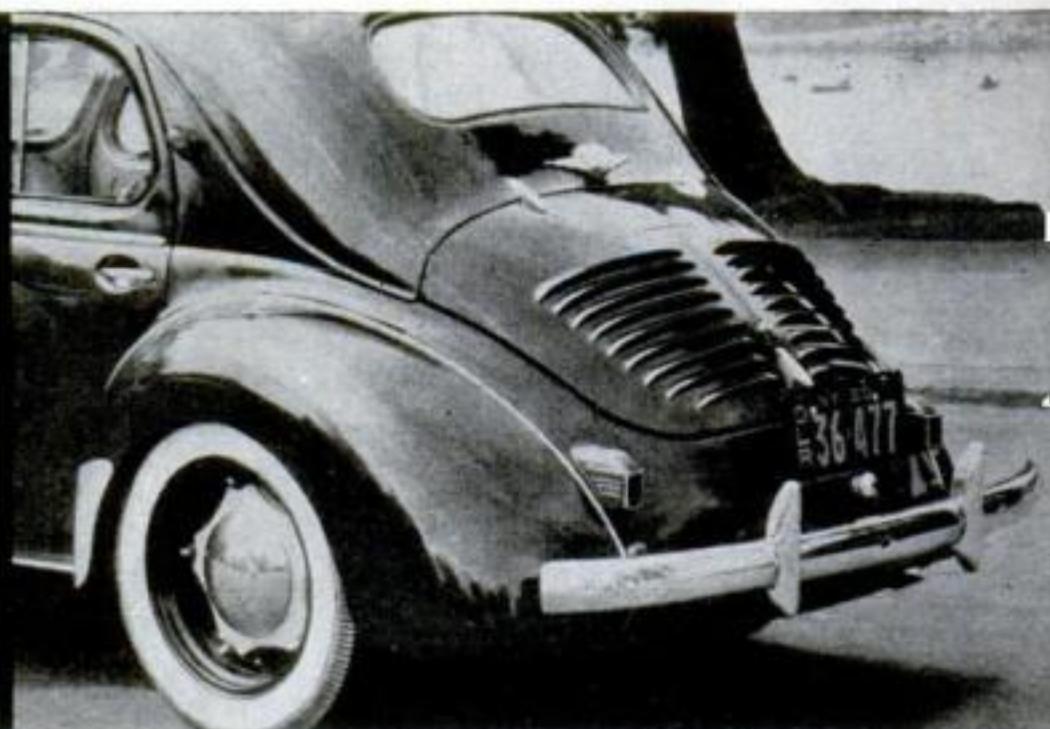


New de luxe model has white-wall tires, chrome grille over engine air inlets on rear fenders, and

better upholstery. It sells for slightly more than the \$1,095 charged for basic model.



Front compartment carries spare tire, 6-volt battery, tools, and small amount of luggage. To top off brakes, fluid is poured into reservoir indicated here. Floor slopes to increase leg room.



Rear engine pushes 1,200-pound midget. Car is 56 inches high, 56 wide, and 141½ long on an 83-inch wheelbase. Note turn light behind rear door, radiator cap above engine cover.

Renault Engine Easy to Get At

By R. P. Stevenson
PS PHOTOS BY HUBERT LUCKETT

FOR BACK-YARD mechanics, the little Renault is a dream come true. In designing it, the French manufacturers emphasized easy access for servicing and repairs. Its four-cylinder, overhead-valve engine rides in what would be the trunk compartment of a standard American car. Everything's within easy reach and there's plenty of work space.

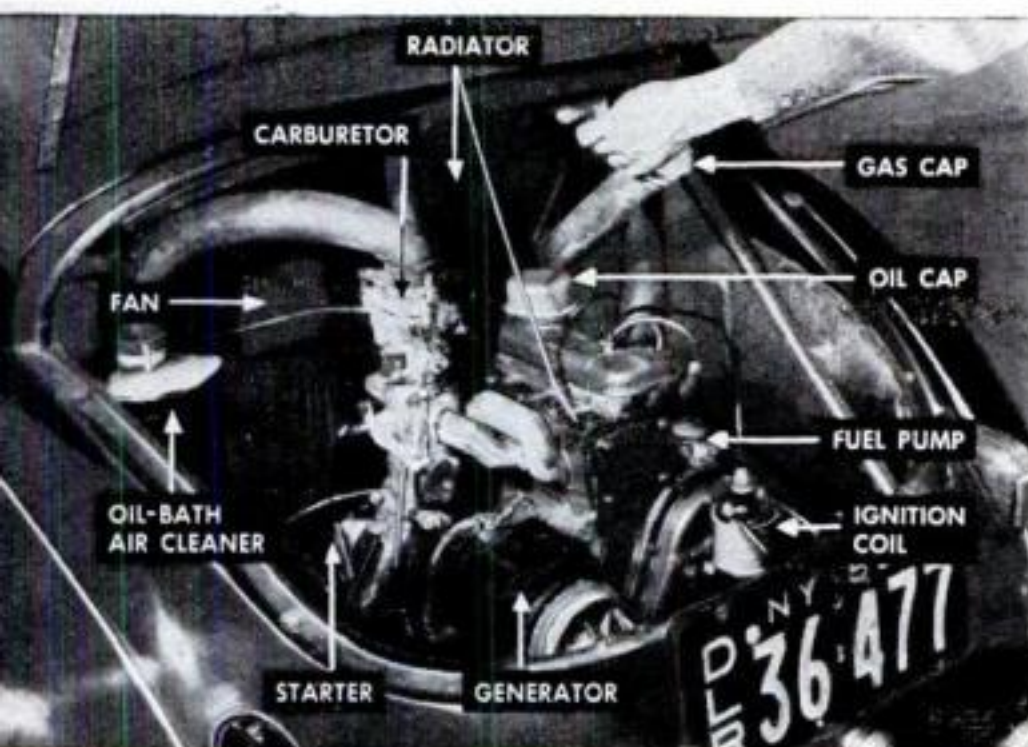
When time comes for an engine overhaul, you can remove the cylinder head (which is aluminum, with tool-steel valve inserts) and simply lift out the wet cyl-



Cockpit controls are unconventional. Lever at base of gear shift is the choke control. Other one behind hand brake is the starter. Cushion was removed to show package space under it.



Steering-column lever blows horn and turns on lights. Besides this, there's a low-high beam button on floor. The wipers operate electrically, and speedometer includes trip indicator.



Engine and accessories are all easy to reach and a built-in light lets you see them. The four-cylinder engine has a 2.17-inch bore, a 3.15-inch stroke, 46.3-cu.-in. displacement.



Rim detaches from center of wheel when you change the 5.00 by 15 tires, a standard U. S. size. Brakes are hydraulic. Car has coil springs, sway stabilizer, and hydraulic shocks.

inder sleeves. Crawl under and take off the crankcase, and you can then pull out the pistons and con rods—also from above.

If the need arises, you can jack up the car and remove the engine, radiator, clutch, transmission, and rear-axle assembly as a single unit. Power is carried to the rear wheels through Cardan (universal) joints. This makes possible independent suspension of the rear wheels.

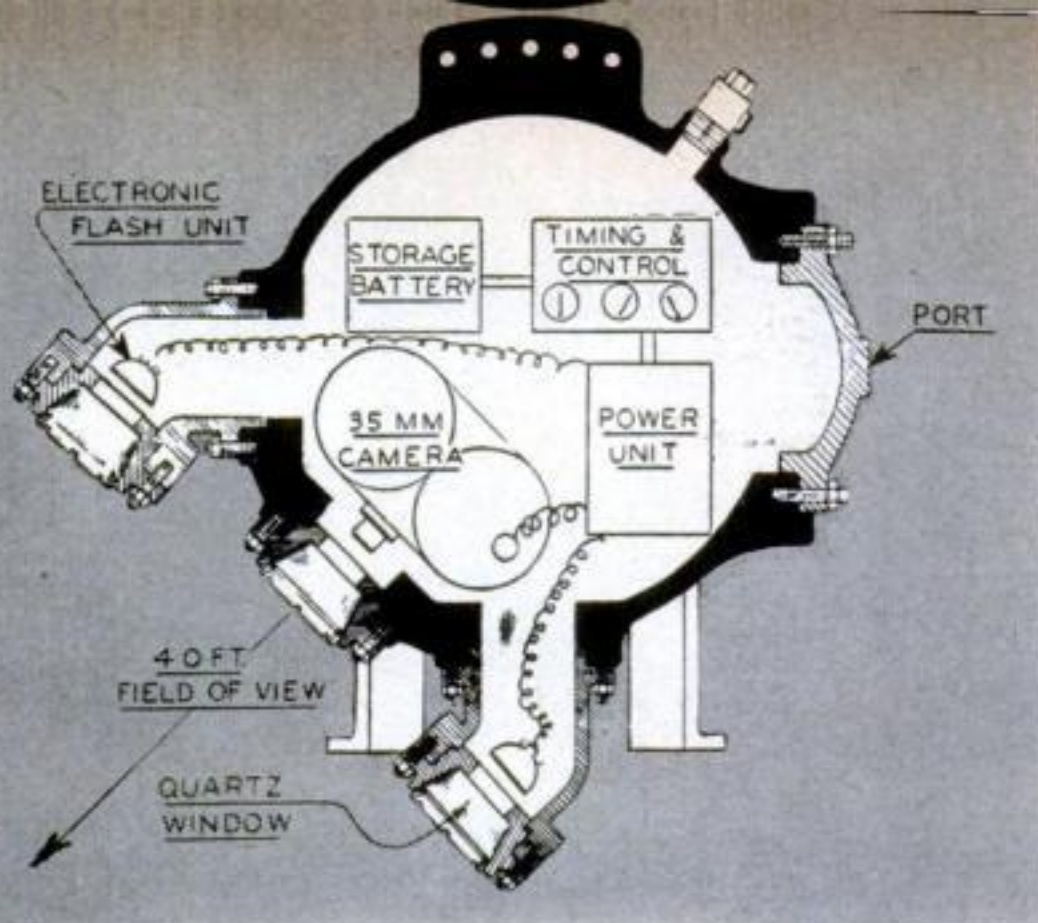
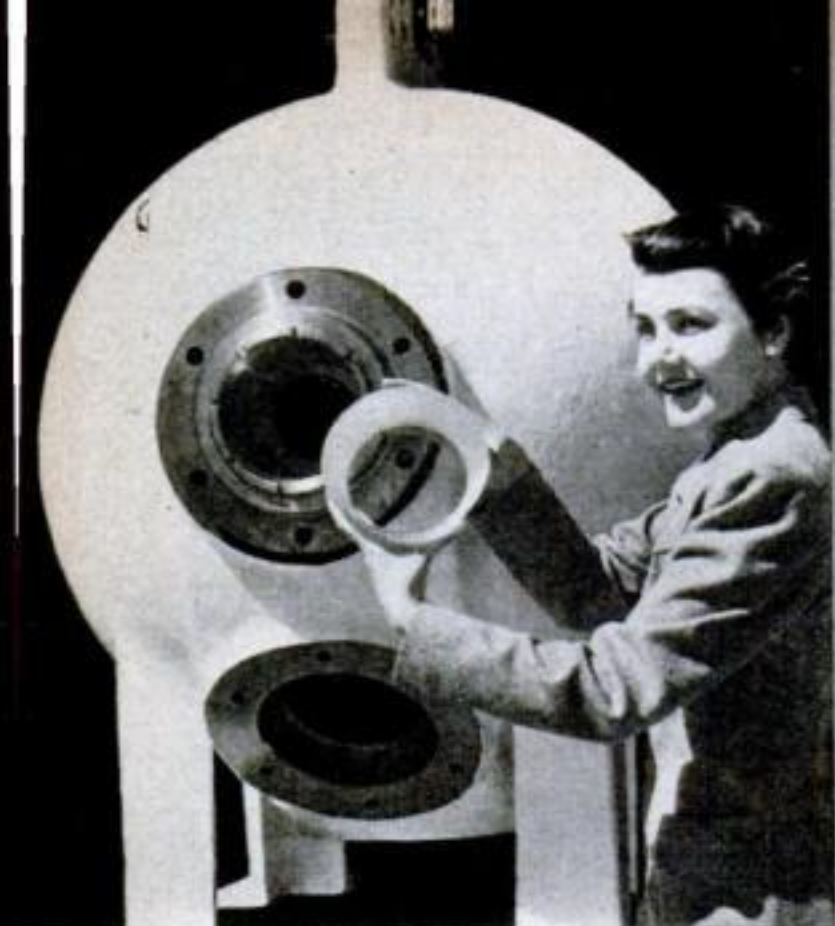
In its 1950 model, Renault is introducing a more powerful engine. Compression has been upped from 6.7-to-1 to 7.5, and

the engine now yields 22 hp. instead of the previous 19. For the first time this year, a de luxe model also is offered, but this adds only a few luxury frills to the standard four-door, four-passenger sedan.

Economy is the keynote. A Renault does about 45 miles on a gallon of gas. The standard model sells in the U. S. for \$1,095 plus transportation costs and local taxes.

The Renault is equipped with a standard three-speed transmission. Top speed is somewhere over 60 m.p.h., and the car cruises nicely at 50.

END

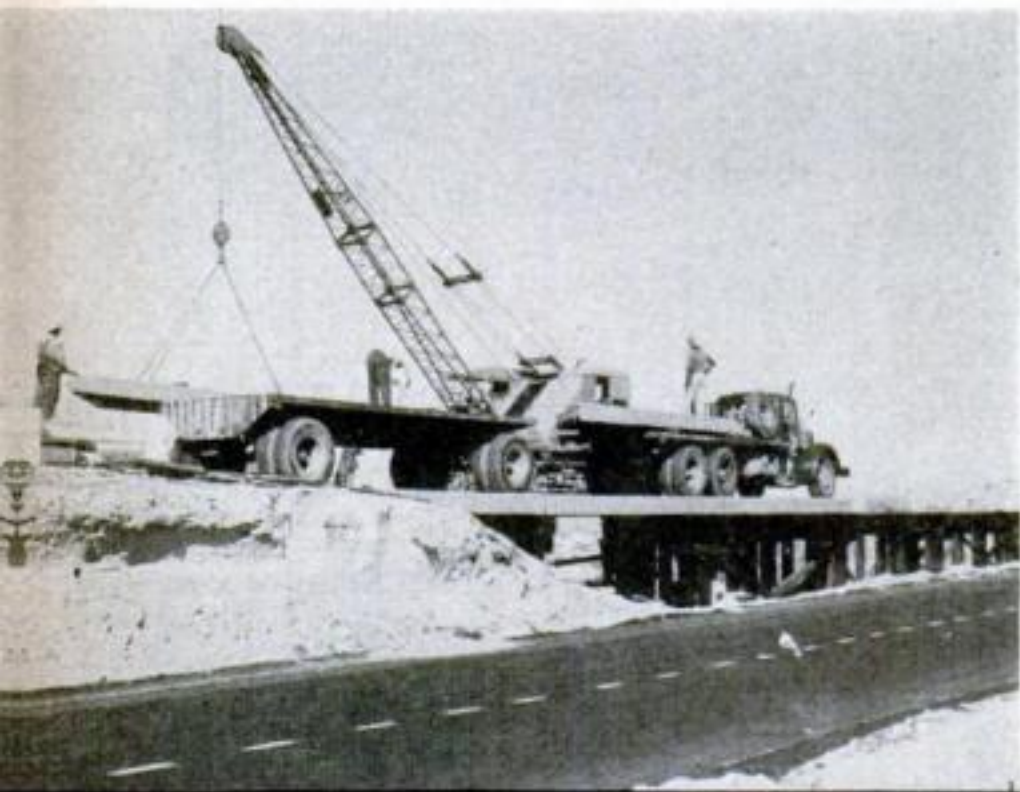


Camera to Explore Deep Seas

HERE'S a baby brother to the diving bell that carried Otis Barton 4,500 feet down into the Pacific last August (PS, Oct. '49, p. 166). The 3,000-pound, unmanned ball is 39 inches in diameter. Its cast-steel shell, $1\frac{1}{2}$ inches thick, can withstand pressures of over 5,000 pounds per square inch at depths of 12,000 feet. Fused quartz windows, like one held by girl at left above, are seven inches in diameter and three inches thick. Two stroboscopic flashers provide light for

a 35-mm. camera to shoot 800 frames at the rate of 12 a minute. Power supply, timing devices, and measuring instruments take up the remaining room, as shown in cross-section view. New sensitive orthicon pickup tubes may make it possible to televise luminescent sea life by its own light. A camera then would record the scene by focusing on a TV screen inside the benthograph. The ball has been designed for deep-sea photography by Dr. Maurice Nelles of the Allan Hancock Foundation at the University of Southern California.

Steel Deck Panels Speed Bridge Building



A NEW type of bridge construction uses prefabricated steel panels for the roadbed instead of planking or concrete. Three-ton sections are shown at left being swung into position from a truck during construction of a bridge at Smoky Gulch, Calif. Panels (lower left) can be made in any shape, and can easily be replaced when worn or warped. Load-bearing capacity is increased by cross-plates on the underside. Finished bridge (below) awaits blacktop surfacing and guardrails, but can carry traffic as soon as panels are bolted together. The system was designed by the California State Highway Dept. and developed by Bethlehem Pacific Coast Steel Corp.





Typewriter with a Memory

"Sets Type" on Photo Film

With electronic calculators, relay grids, and a flashing strobe light, supertype-writer makes cast type unnecessary.

DRAWINGS BY RAY PIOCH

MOVABLE type, Gutenberg's 15th Century brain wave that makes printing possible, is threatened with obsolescence by a system combining the sciences of electronics and photography—with a bit of almost-human judgment thrown in.

Movable type, which put an end to the hand-copying of manuscripts, made the printed word one of the most potent means

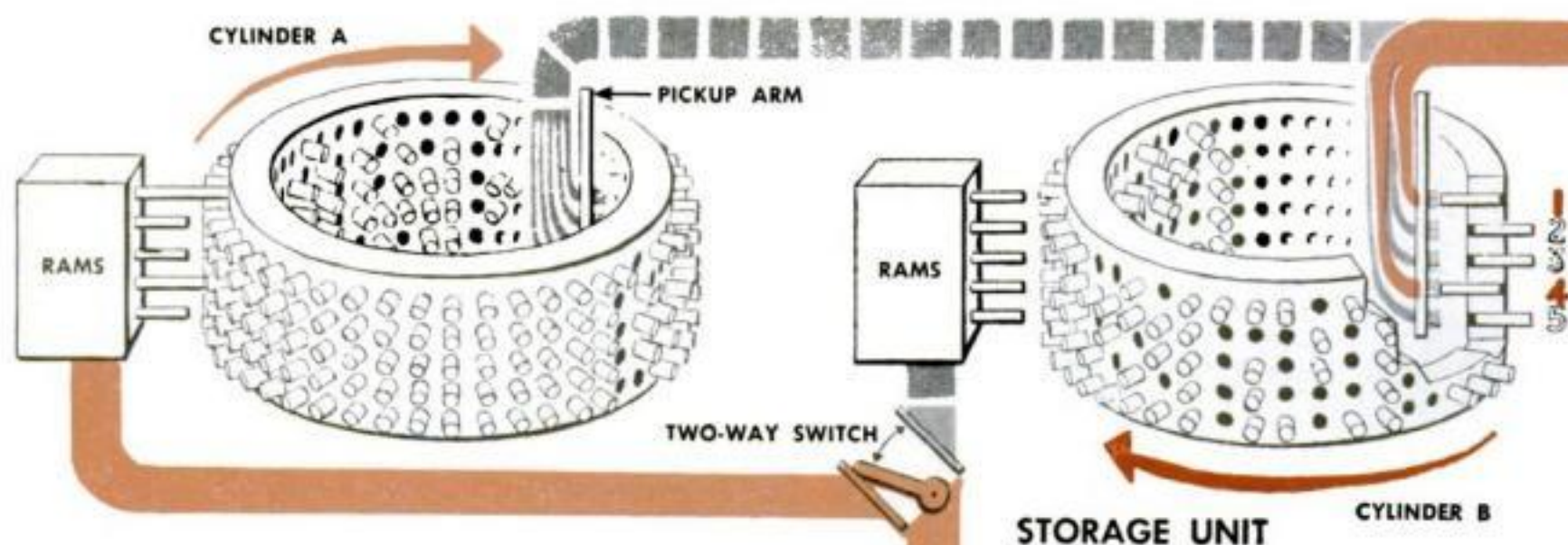
of communication man has. Technically, though, type is a slow, clumsy, and costly method of doing the job. Conventional type came close to the end of its technological rope more than half a century ago, when the Linotype machine was developed. This device made possible the mechanical casting of type by lines, superseding letter-by-letter hand composition. This advance, along with the change from wood to metal slugs, is one of the few fundamental improvements in the art since the printer put the manuscript copyist out of work.

Recently, research in the graphic arts has been seeking [\[Text continued on page 96\]](#)

How Photo-Printer "Remembers" Line, Spaces

1 Typist taps out copy on electric typewriter with standard keyboard. Each character has a two-digit code number—for instance, 1-4 for capital S. Hitting key sends signal that actuates first and fourth of five rams alongside cylinder A in storage unit below. Rams push in pins 1 and 4 in one of several vertical rows of five pins each around cylinder. As successive keys are hit, cylinder turns slowly. Codes for a complete line are thus stored in successive rows of pins before signals are sent on to photo projector at bottom of opposite page. This lets typist backtrack and make corrections, if necessary, after proofreading what is written before it is projected on film. Meantime, previous line—stored on cylinder B—is being transmitted to projector. Two-way switch alternates cylinders

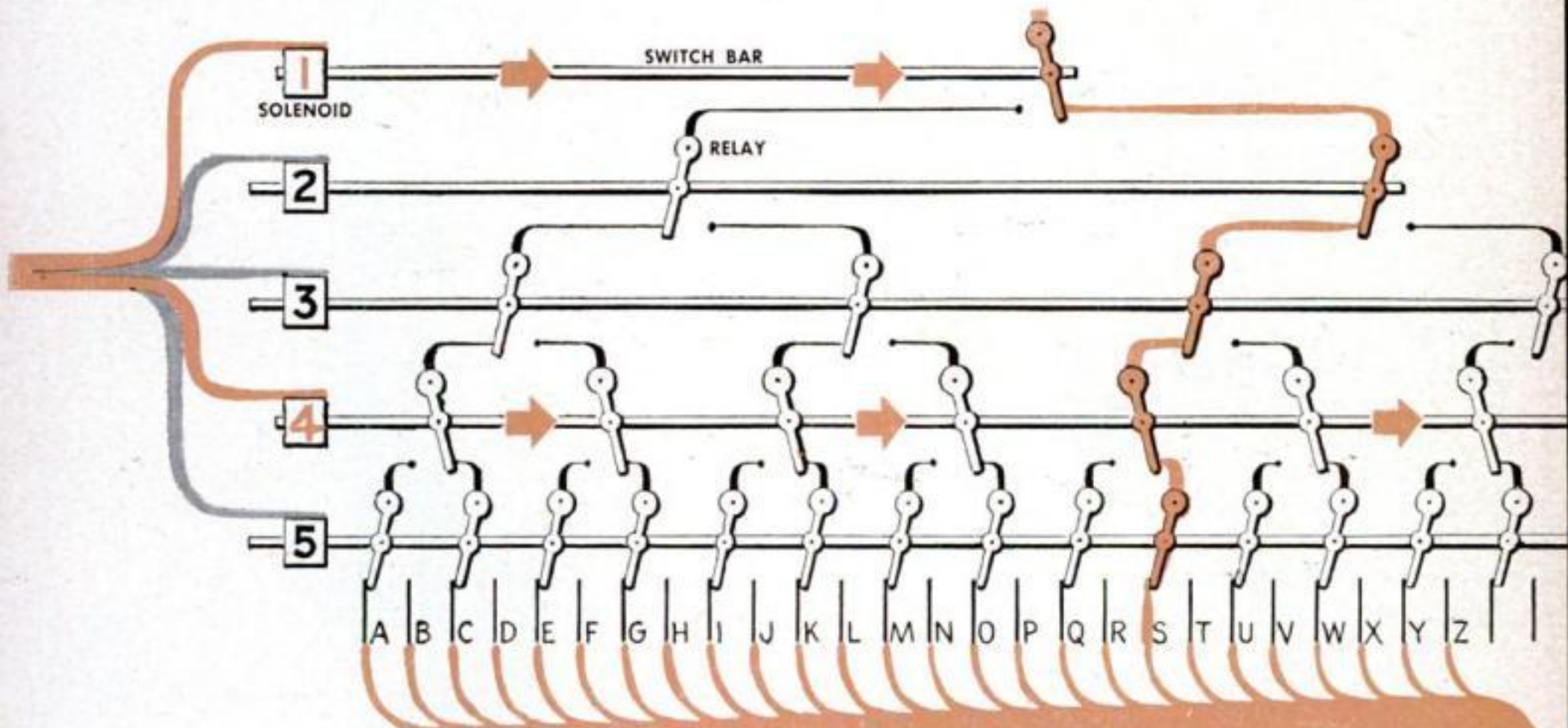
as typewriter carriage is flipped back to start a new line. (Drawing on these pages is a simplified schematic diagram of the actual photo-composing machine, which has seven rams for each cylinder and seven pins in each row to provide enough code combinations for the 80-odd characters in a type font.) Indicator beside typist, showing how much space in line is used and how much left, guides typist in stopping as line nears its upper limit. Character and space counters feed data to justifier mechanism, a computer that automatically distributes unused space between words, so line will come out even on right-hand side when it is projected on film. Visual indicator under glass at typist's right tells when line is in justification range and also shows previously composed lines.



It Accurately, and Flashes It Onto Film

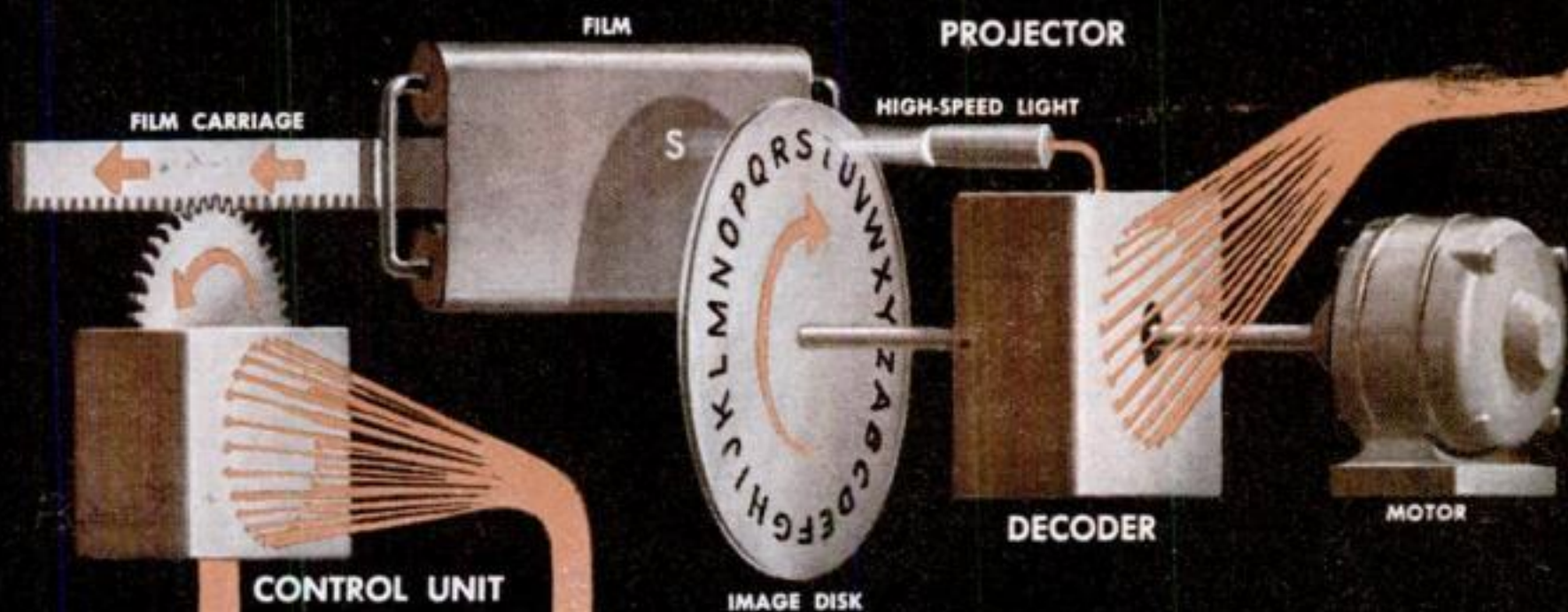
2 As cylinder B rotates, code signals for stored-up line of print are picked up from protruding pins by five brushes spaced along an arm that wipes its inner surface. Each brush is connected to one of five solenoids (below), numbered to correspond with rams and rows of pins. Solenoids switch telephone-type relays along bars extending to right. All relay contacts remain toward left when solenoids are not actuated. When pickup arm brushes row of pins

carrying code for capital S, actuating coils 1 and 4, solenoids push contacts of relays on bars 1 and 4 to right. This channels current to the correct lead to photo projector unit at bottom of page. While actual solenoid-relay network is more complex, it works on the same principle in translating pin-position code into electrical impulse to produce the desired letter. The system of solenoids and relays is engineered to work at high speed in selecting letters.



3 Leads from relays run to contacts on decoding drum around shaft of motor that turns a pickup arm and disk rimmed with images of letters. When pickup touches a live contact, high-speed flash lamp projects image of letter onto film. Lens system, not shown, can change size of

letters. Other leads from relays go to carriage-control unit. This moves film carriage correct distance for width of letter. Separate signals to control unit from justifier, at its left, move carriage for space between words to fill out line. Machine positions letters with great accuracy.



to simplify type composition, with several goals in view: reduced costs, greater speed, greater flexibility, and better quality. Several potentially revolutionary methods have come over the horizon (PS, May '48, p. 107; April '49, p. 133).

Much of this work has been concentrated on photographic processes, in which the flat image of the letter can be substituted for three-dimensional type. Since printed matter exists in two dimensions, there is no more excuse for a three-dimensional approach than there is for a solid silhouette.

Typist Can Run It

With the introduction this summer of the prototype of one of the most promising photocomposing machines, the eventual triumph of shadow over substance and modern science over medieval ingenuity seems closer at hand than ever before. This machine is almost as automatic as a typewriter, and can be operated by a semi-skilled typist with scant chance of error. The machine is no bigger than an office desk.

The material to be "set" is typed on a standard electric typewriter in the center of the machine. The line appears on a roll of paper for examination and necessary corrections. If an error has been made, the carriage is moved to the point of error, a

correction key is pressed, and the proper letter is inserted. The column width of the line has been set. Under glass at the right the typist sees a visual representation of the page being produced. As she types, a line creeps along toward the right margin to show how much space is left.

As each letter or symbol is struck, its identity and width is recorded within the machine, as are the spaces between words. But since the operator has stopped before filling the line, the characters and spaces typed fall short of the column width by some hundredths of an inch, the units in which the machine measures.

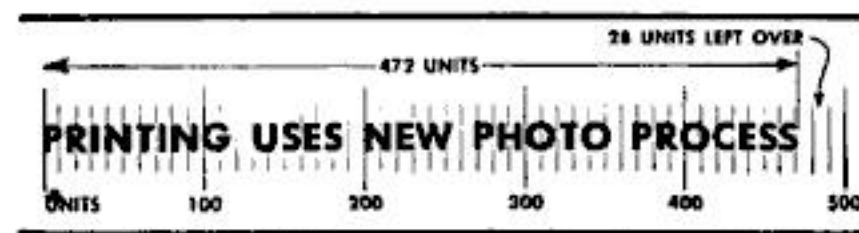
At this point the photocomposing machine gets smart. Having been instructed to proceed to record the line on film, after the operator has checked it for accuracy, the machine takes judicial notice of the fact that the line won't "justify"—extend out to the right-hand margin.

The mechanism has already noted the number of interword spaces, and it now "knows" how many units of space the line is short. If the number of spaces and units are the same, an electronic computer increases each space by a unit; if there are more units it divides them into slivers of a hundredth of an inch and adds them evenly to the spaces in the line. Except in cases

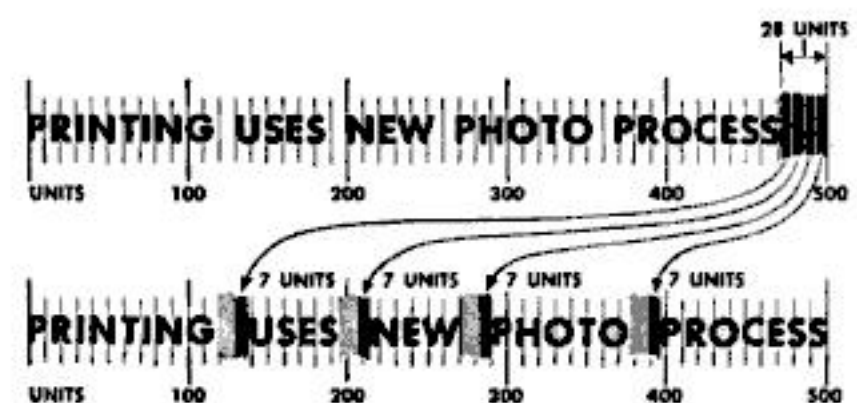
How Photocomposer Solves Spacing Problem

By electronic arithmetic, the new machine neatly allots space to make each line "justify"—come out even. Assume that here the typist has set the machine to make 500-unit lines. As each key is struck, the particular width of that character is noted. Besides keeping total of character widths, counter adds the nominal

space between words. With the line provisionally finished, the two counters pass their information on to the justifier. Subtracting the character-width total from the over-all line length, an electronic computer determines that there are 28 units to be disposed of. It then divides this by the number of word



space between words. An indicator by the typist continuously shows how many units remain unused in line. This lets typist stop at a word or word division as total nears 500 units. In the diagrammatic example above, the typist stops typing when the count reaches 472 units.



Another counter, meanwhile, has been noting and adding spaces between the words typed.

spaces (four, in this case), and apportions seven extra units to each word space, making the line come out exactly 500 units. If the division doesn't come out even, the line is spaced out unevenly in hundredth-inch units, so small you can't see the difference.

involving very small column widths, this should eliminate such typeset lines as:

Jones said he stepped slowly t h r o u g h which tend to leave the reader breathless.

With great rapidity the machine then puts the line on film, doing this while the subsequent line is being typed. Each character in the line, which has been stored up in one of a pair of "memory" cylinders, is identified by a decoder. The decoder is linked to the movement of a spinning glass disk, on which are arranged characters of the selected font, or variety, of type. If an "A" is wanted, as the letter comes into position the decoder triggers a strobe light that produces a two-millionths-of-a-second flash, recording the "A" image on the film.

At the same time other control devices supervise the movement of the film along behind the spinning disk. Though capable of great speed, they move so precisely that letters can be positioned within five ten-thousandths of an inch.

Use of an opaque character on a clear disk produces a photographic negative, suitable for use in engraving the final printing plate. To obtain a photographic positive, the elements would be reversed—an opaque disk with a clear character.

"Sets Type" Three Times as Fast

The photocomposer can "set type" three times as fast as mechanical line setters now in use, it is claimed. Definition of characters is noticeably sharper than those obtained from type—which is reasonable, since a beam of light can be more precisely controlled than hot metal in a mold.

Advances planned for future models include use of a drum holding 20 fonts of type, any one of which can be selected by the turn of a dial; installation of a lens system to permit each font to be used in nine different sizes; automatic development of the film within the machine; and an automatic stripping device for rephotographing changes and corrections onto new film.

Invented by two French engineers, Rene A. Higonnet and Louis Moyroud, the photocomposer is being made under the sponsorship of the Lithomat Corporation, of Cambridge, Mass. The patents have been assigned to a nonprofit group, Graphic Arts Research Foundation, Inc., supported by a large number of publishers, which will undertake the development of this machine and other advances for the printing art. **END**



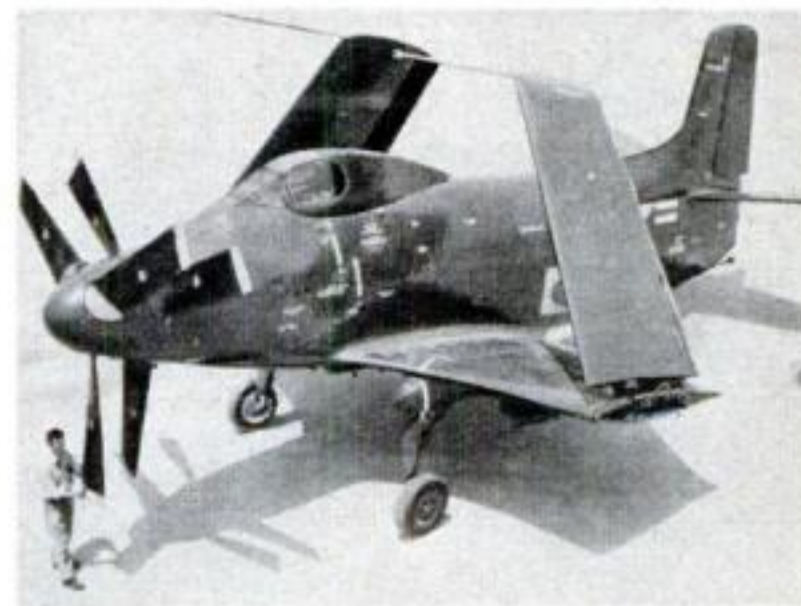
Caddy Engine Soups Up Ford

THAT'S a Cadillac engine being lowered into a standard 1950 Ford. Walter L. Williams and Harold Sheldon, of Detroit, who make the conversions for \$1,000 up, claim that their hybrid jobs will do better than 120 m.p.h.



Holes Slow Practice Ball

EXCEPT for the holes, this plastic practice golf ball looks, feels, and even sounds like the real thing. But it travels only one-tenth as far when hit. The maker, Pee Gee Bee, Minneapolis, Minn., says it will not harm windows or furniture.



Navy's Turboprop Bomber

TWIN gas turbines of 5,000 hp. turn contrarotating props to give this Navy attack bomber the quick take-off of propellers and the speed of jets. Douglas built the XA2D Skyshark to fly off carriers with rockets, bombs, or torpedoes.



Sight, shoot, and mail—that's all. Camera is fixed-focus, box type, with meniscus lens. Film is unperforated 35 mm. Prints are enlarged to 3¼ by 4½ inches. Note self-addressed wrapper.

Film Package Is Camera, Too

EVER been caught at some beautiful scenic spot without your camera? Soon you'll be able to stop at a drugstore or newsstand and pick up one of these new Photo-Pac cameras—for \$1.49. You won't have to buy any film, because that's already in it. And when you've taken the 12 exposures, just put your name and address on the pasteboard wrapper and drop the whole thing in a mailbox. You'll soon get back a set of enlarged prints. You won't get the camera back, because that's reloaded and sold again. Now available at Gimbel's in New York City, the cameras will go on sale throughout the country soon.



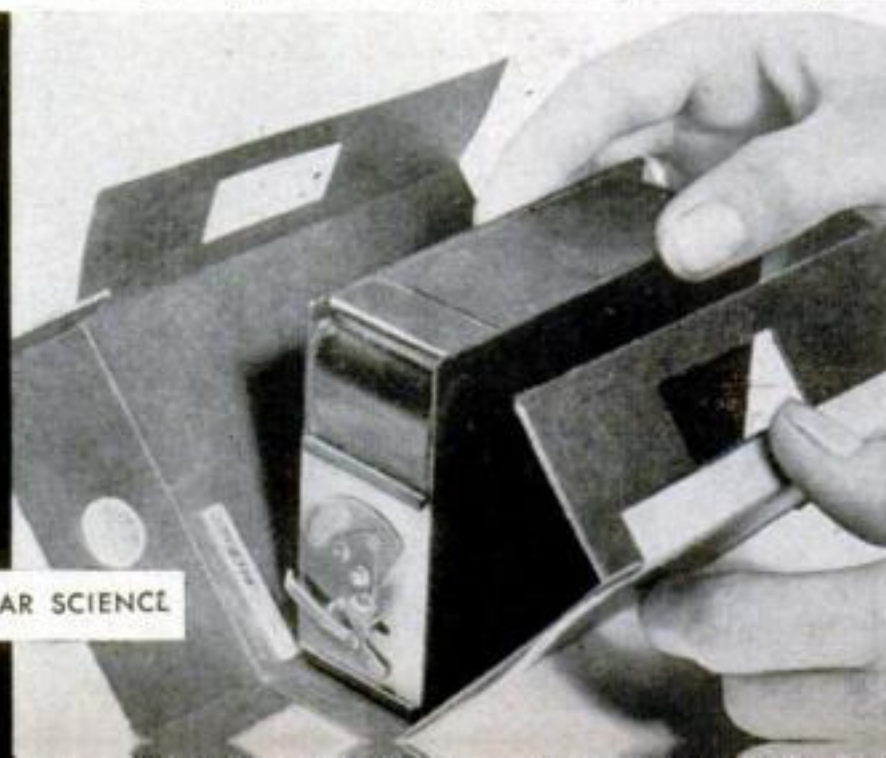
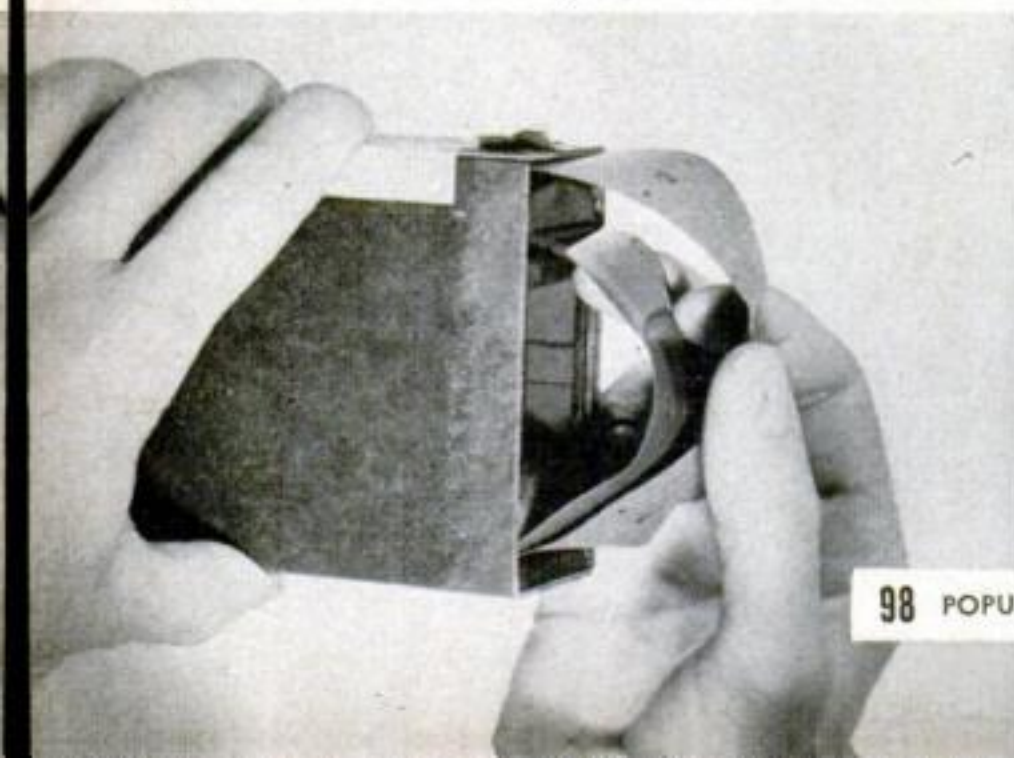
Folded tab on top of pasteboard wrapper forms view finder. User sights through hole in back, sees picture framed in square cutout in front. Finder can even be adjusted for parallax.

Paper leader, rolled up with film, acts as simple transport mechanism to advance film after each exposure. At factory, old wrapper and exposed film are removed, and the camera reloaded.



Cutout in top of wrapper lets paper leader show through. Film is advanced by simply pushing leader forward with thumb until exposure numbers on leader line up with arrows on wrapper.

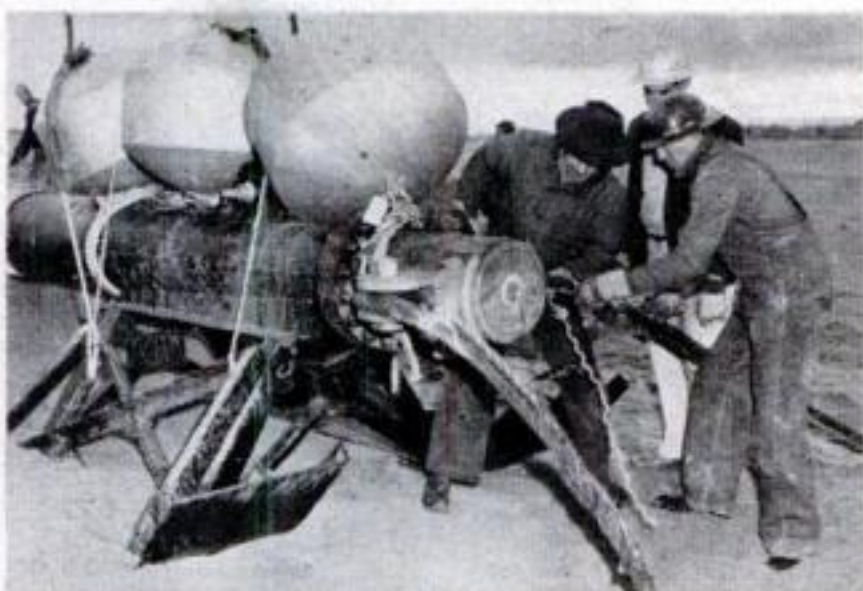
Heavy, black cardboard, under lighter mailing wrapper, keeps out light, protects molded-plastic camera inside. Simple shutter is spring-actuated, single-blade type, with 1/50-sec. speed.



Undersea Pipe Taps Tanker's Oil



Sliding down beach on heavy sled, winch-towed oil pipe starts 3,500-foot journey into the sea.



Heavy towing cables from winches aboard anchored barge are attached to end of first pipe section. Sled keeps pipe end from digging into sand, and small steel buoys lessen pipe's weight.

THIS new "submarine service station" can transfer 120,000 barrels of oil a day from ship to shore. A pipe extending $\frac{3}{4}$ of a mile into the ocean, it permits tankers to deliver fuel oil directly to a power plant on shore. An anchored tanker hauls up the buoy-marked end of the pipe and starts pumping.

When the pipe was laid, the first of its seven sections was towed into the water by a cable hitched to a winch on a barge anchored 3,500 feet out. Then sections were joined to the shore end one by one, and the growing line dragged out until the entire pipe was in place. Pacific Gas and Electric did the job at Moss Landing, Calif.



As pipe is pulled out to sea, succeeding sections are welded into place, and joints are coated with compound to prevent corrosion. Pipe is 18 inches in diameter, 3,590 feet long.



First oil delivery is made as tanker anchors near marker buoy, pulls up 200-foot, flexible tube attached to sea end of pipe, and starts pumping. It discharges 8,000 barrels an hour.

Diver Battles Shark



The shark slashed at Fenton's arm. Luckily, it caught only his sleeve. Fenton struck back with his knife.

in Tunnel Under Sea

DON'T take a poke at a shark—even a harmless one. That's the advice of John Fenton, and he learned the hard way—40 feet down in the Middle Bight of the Andros Islands in the Bahamas.

All Fenton wanted to do was test a new underwater movie camera. One day he and H. S. Moncrief, manager of the Fenjohn Underwater Photo & Equipment Co., were on the bottom, combining a little pleasure with business by testing the camera in a strange undersea tunnel. That's when the shark came along.

It was a seven-foot seven-inch nurse shark. Nurse sharks are harmless—the books say—so Fenton patted it on the head. This the shark didn't like. It slashed at Fenton's arm. Luckily it caught only his sleeve. Fenton struck back with his knife. Even after the shark had been killed, its grip was so tight that he had to cut away his sleeve to get free.

How did the camera work? Perfectly. The underwater photographs on this page and the next are taken from the test film.



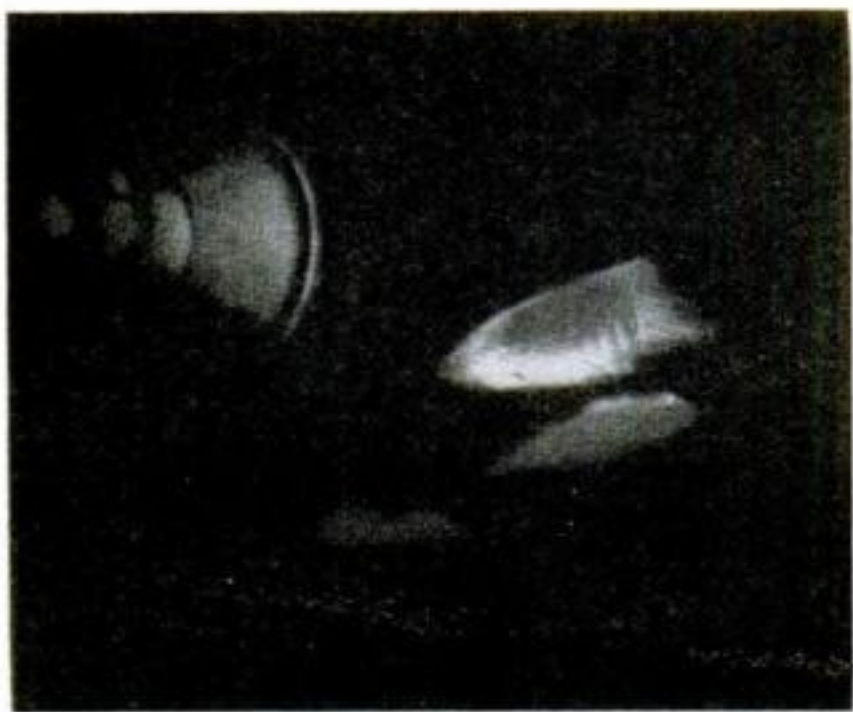
1 Discovery of this salt-water pond on Gibson Cay, a coral island, began adventure. Crew guessed an underwater tunnel led to sea, decided to explore while testing camera.



2 Over the side goes one of the divers. Equipment to be tested is new undersea movie camera—a newsreel Eyemo adapted so all controls can be worked from outside special case.



3 This is entrance to underwater tunnel feeding inland lake. Notice fish (upper right), attracted by bright light from special underwater lamp held by diver. [Continued on next page]



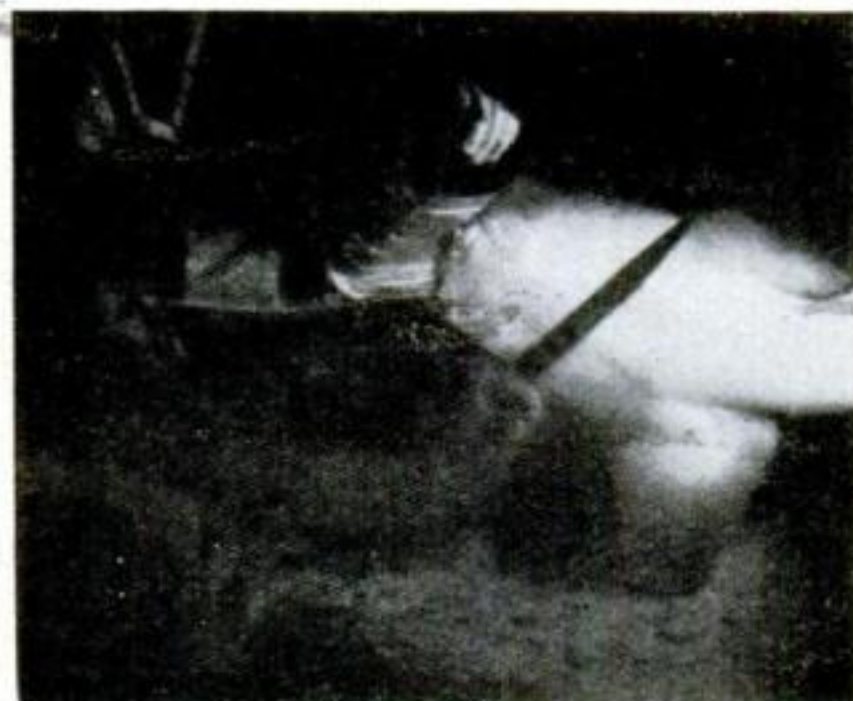
4 Here comes trouble—a shark that cameraman H. S. Moncrief says "later measured 7 feet 7 inches, but looked twice as big." Fenton recognizes it as a "harmless" nurse shark.



5 So Fenton pats it on the head. This is a mistake. The shark "either had a sore head or it was one," reports Moncrief, who sticks by the camera until the fight is nearly finished.



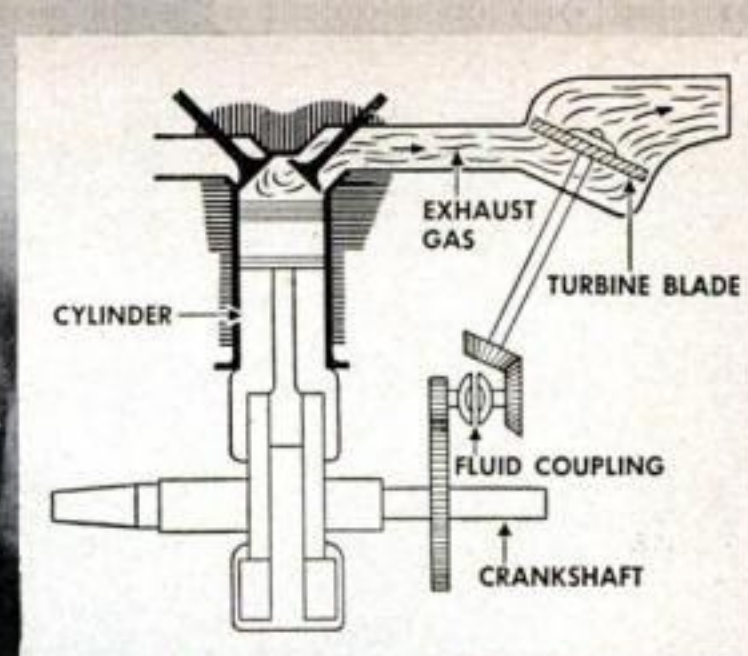
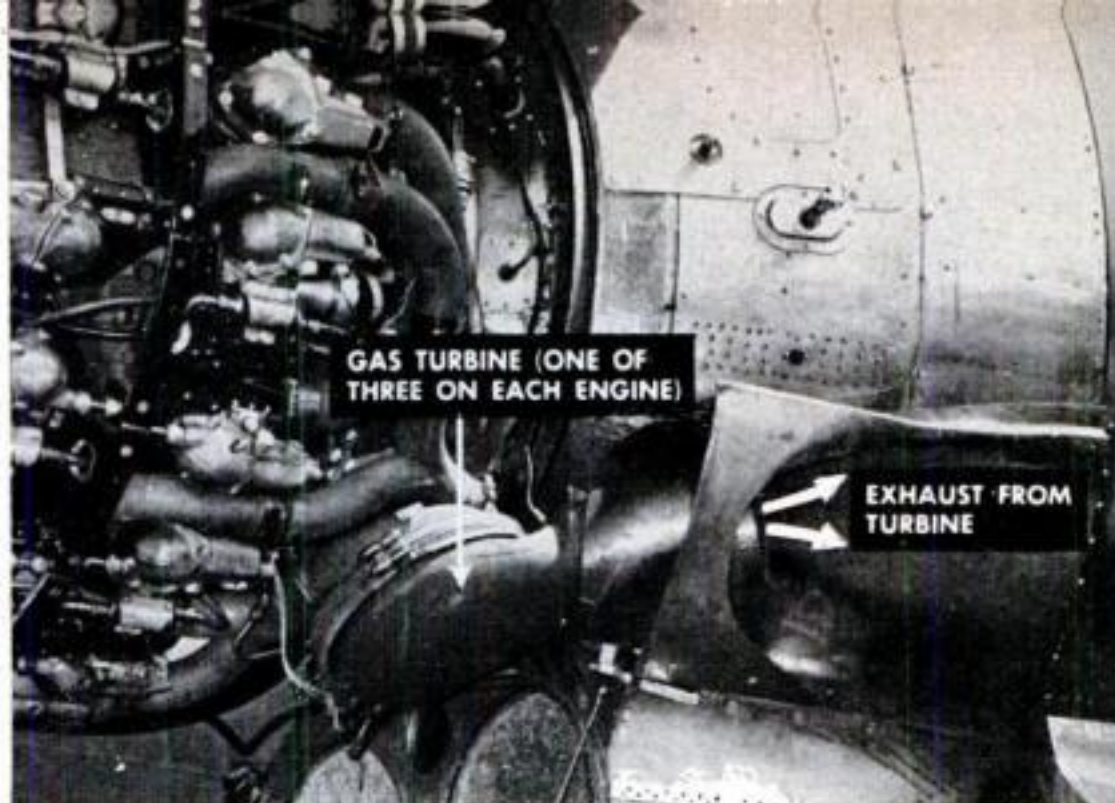
6 The shark strikes. It narrowly misses a big bite of Fenton's arm, but instead catches his sleeve. It holds on with a viselike grip, twisting and shaking the way a bulldog does.



7 Fenton fights back with knife. He kills the shark, later has to cut sleeve away to loosen fish. This is the last fight picture: Moncrief leaves camera at this point to help Fenton.



8 Happy ending for everybody except the shark. It was cut up and thrown back into the ocean for its relatives to eat. The test film was okay—these pictures were enlarged from it.



Waste-Saving Engine Gives Plane More Power

ENGINE exhaust gases, once spewed wastefully into the air, are now being put to work to give added power to the Navy's long-range P2V-4 Neptune patrol plane. Installed for the first time in a production-model plane, the new Wright compound engine (PS, Dec. '48, p. 128) is basically a piston engine. Its cylinder exhaust gases, however, are used to spin turbines that are linked through a fluid coupling to the en-



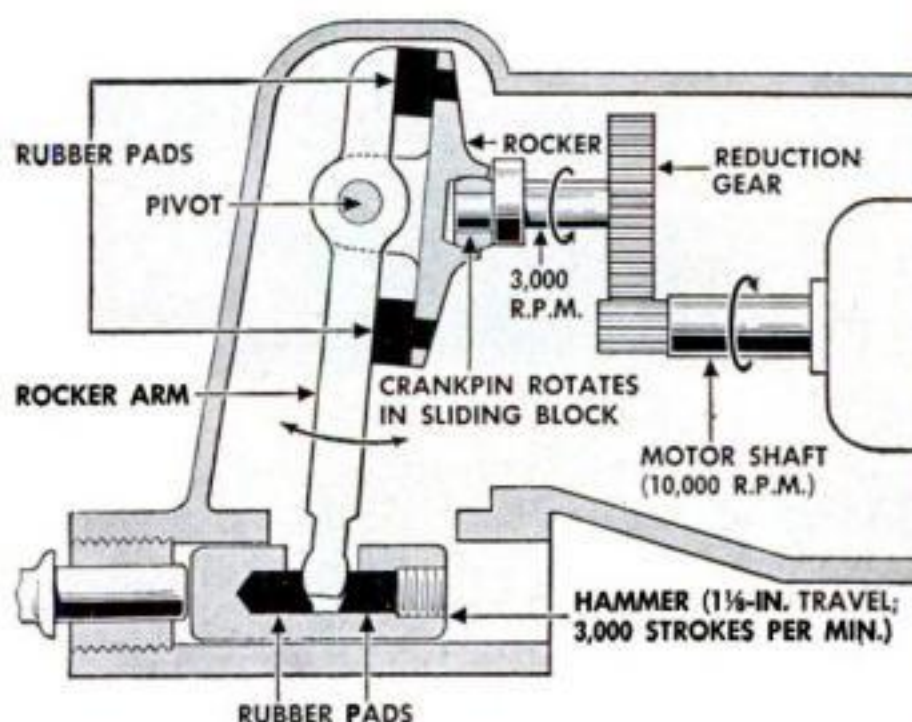
gine crankshaft. The result is a 20-percent increase in power, adding vital speed, range, payload, and take-off power—all for free on the same amount of fuel.

New Motorized Hammer Has More Kick, Less Jar

THIS new lightweight electric hammer weighs only 7½ pounds, yet is said to pack the wallop of much heavier, more expensive tools. It will slice through auto-body steel (right below) at six inches a second, drill through masonry at an inch a minute.

The secret is an ingenious method of converting rotary motion to reciprocating motion, invented by R. F. Jackson, of Cleveland, Ohio. The motor drives a crank pin

fitted into a pivoted rocker, moving the rocker back and forth as the pin turns (drawing). This rocking motion is transmitted by two neoprene-rubber pads to an arm that actuates a ¼-pound hammer. The rubber absorbs shocks and gives the hammer a whip action that sharpens its blows and nearly doubles its normal length of travel. Made by Noble & Stanton, of Bedford, Ohio, the Super Slugger sells for \$89.

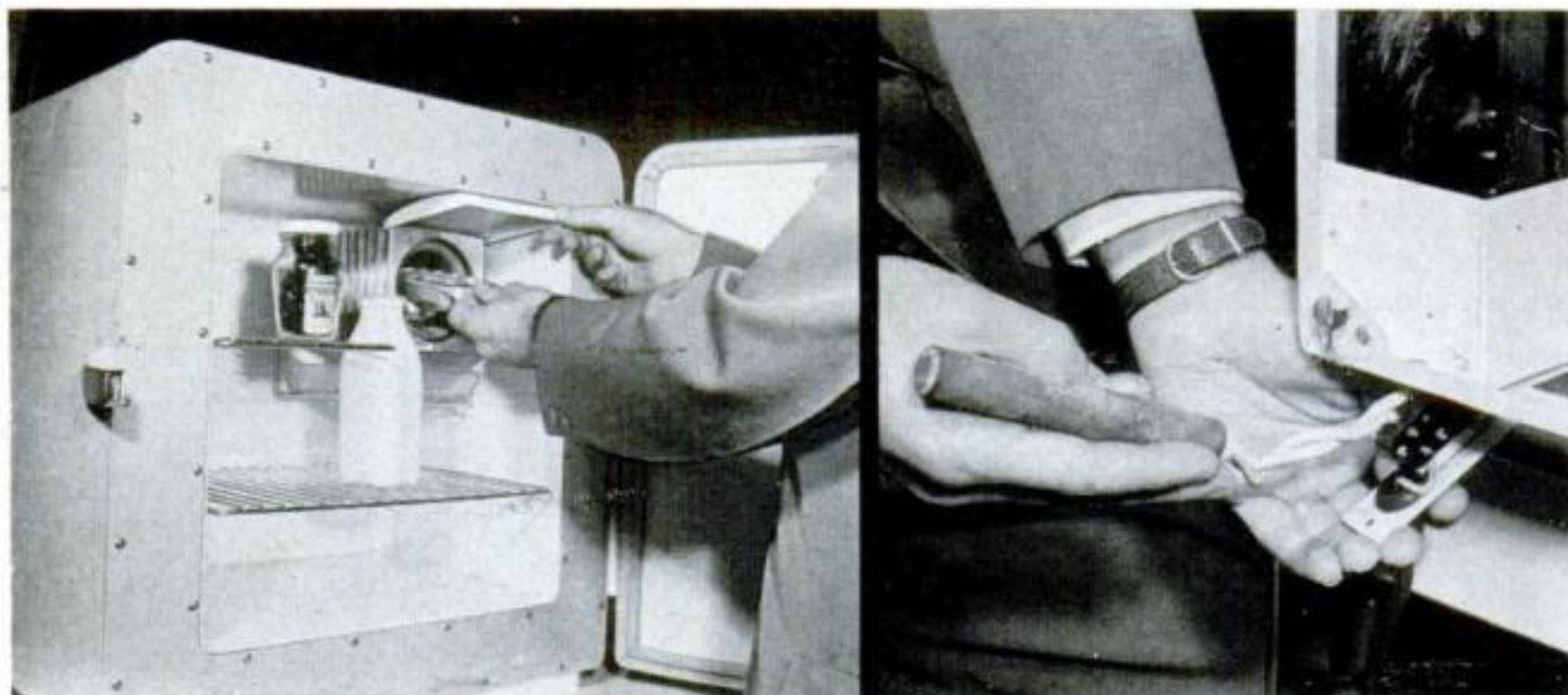




Small-Size Station Wagon

CALLED the lowest-priced custom station wagon on the market, the Rambler, above, is now part of the Nash line. The basic mechanical features duplicate those introduced in the Rambler convertible sedan (PS, May '50, p. 110). The five-passenger, two-door station wagon has 100-inch wheel-

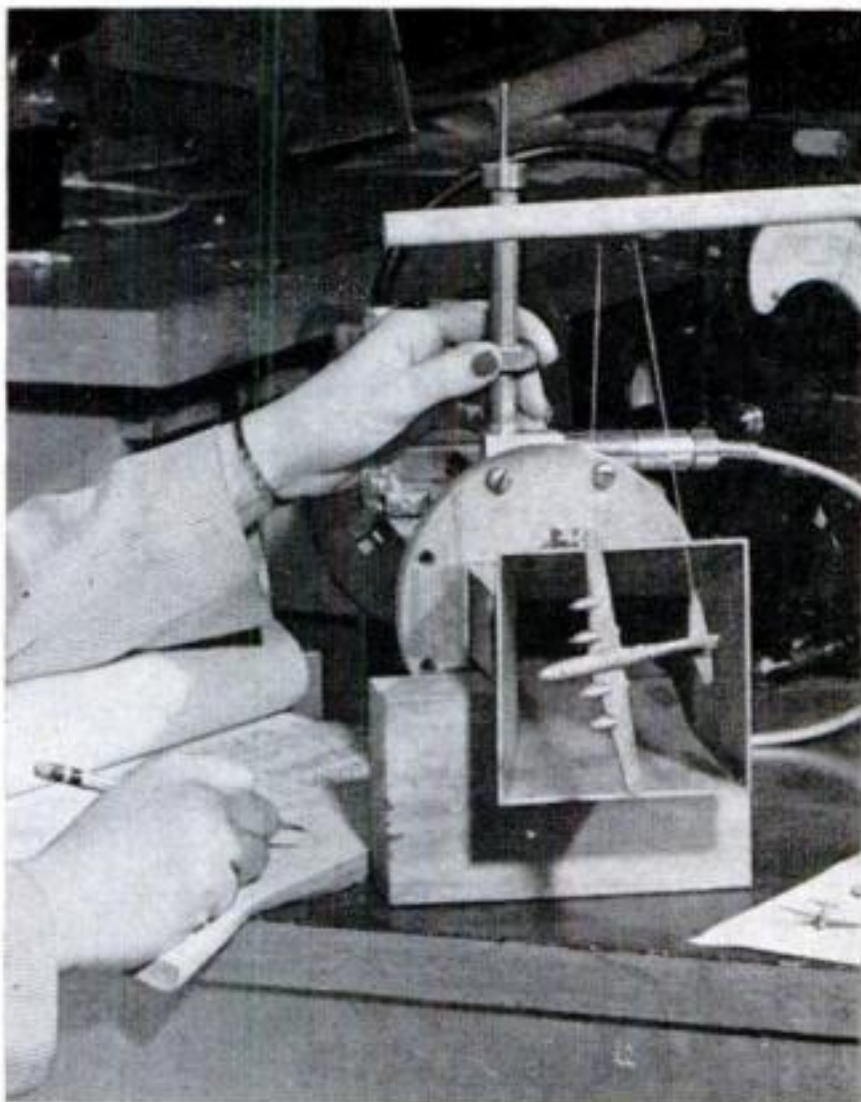
base, and an 82-hp. six-cylinder engine of 7.25-to-1 compression ratio. Overdrive is an optional extra, but a radio, special ventilating system, and turn indicators are standard. An all-steel body, with simulated wood trim, cuts weight. Backed with steel, the rear seat folds forward to lengthen and become a part of the cargo-compartment floor, under which the spare wheel is stored.



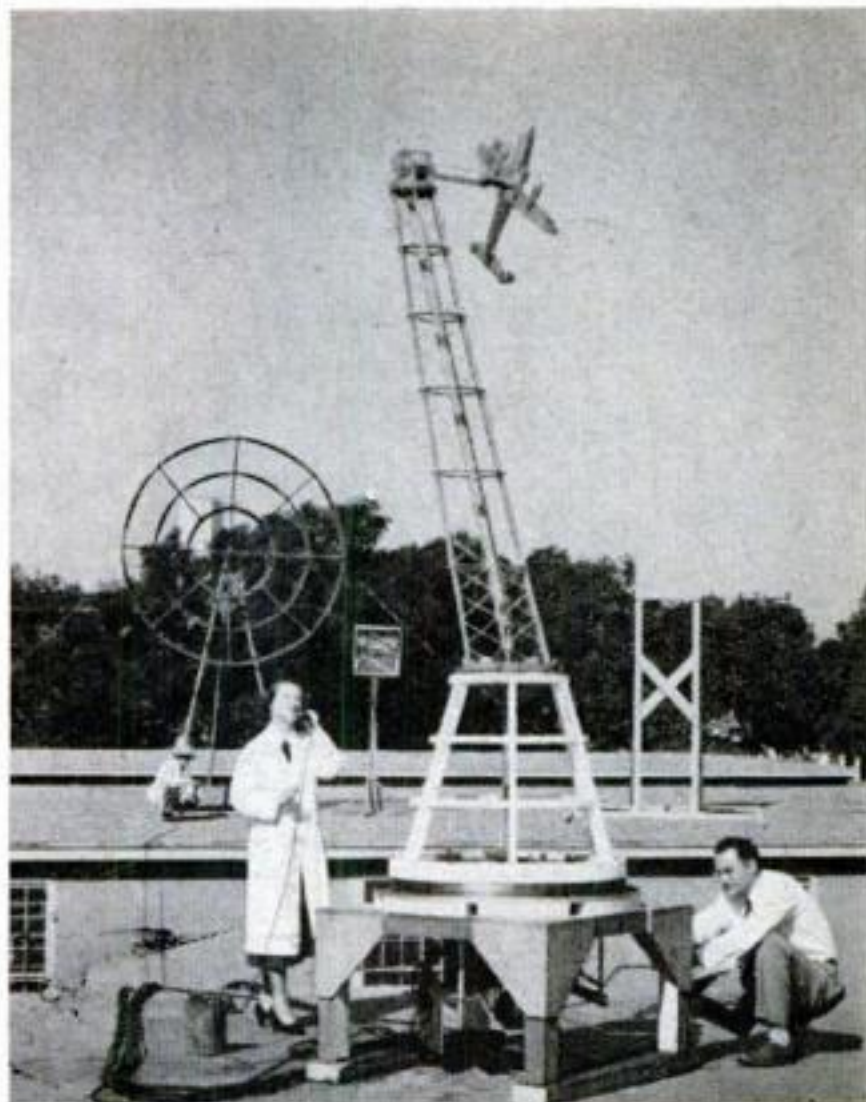
Refrigerator Works Anywhere

A PORTABLE refrigerator that works on almost any kind of electric power can keep food cold even in your car. The two-cubic-foot box employs the heat-cooling principle long used in gas and kerosene refrigerators,

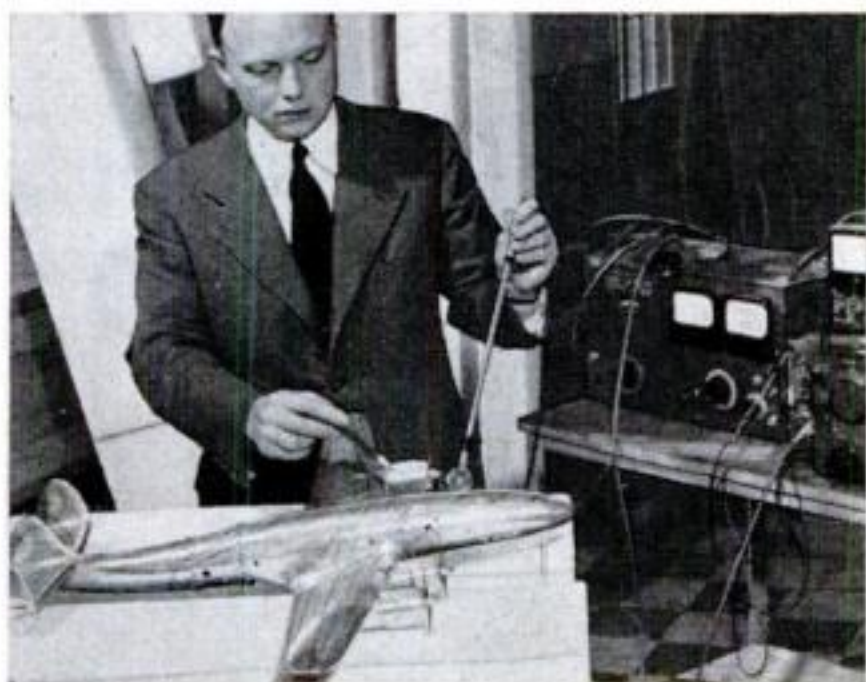
but has an electric heating element instead of a flame. The inexpensive element is easily changed (above) to suit almost any voltage between six and 220. It consumes about 95 watts. The Astral, available for some time in England and Canada, is now sold by Macy's in New York for about \$130.



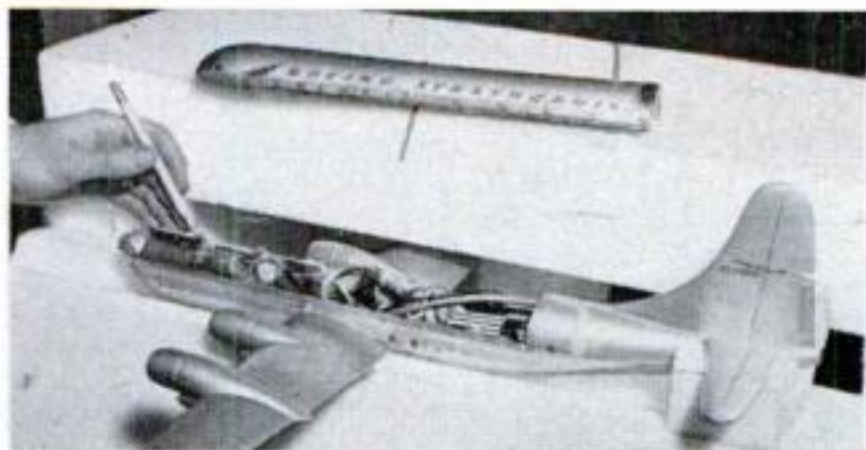
This B-29 has wings only four inches long, but it tells Stanford researchers how radio waves react with the structure of a full-size plane. For the test, microwaves from the horn are used.



On measuring range, the effect of angular heading of an aircraft on an experimental antenna is being studied. Circular structure in the background is a directional receiving antenna.



What happens to the radio currents from a buried antenna in this model Constellation is traced with tiny loop antenna (end of stick).



The cargo in this miniature Stratocruiser is an instrument that measures radiation patterns from an experimental tail-cap antenna.

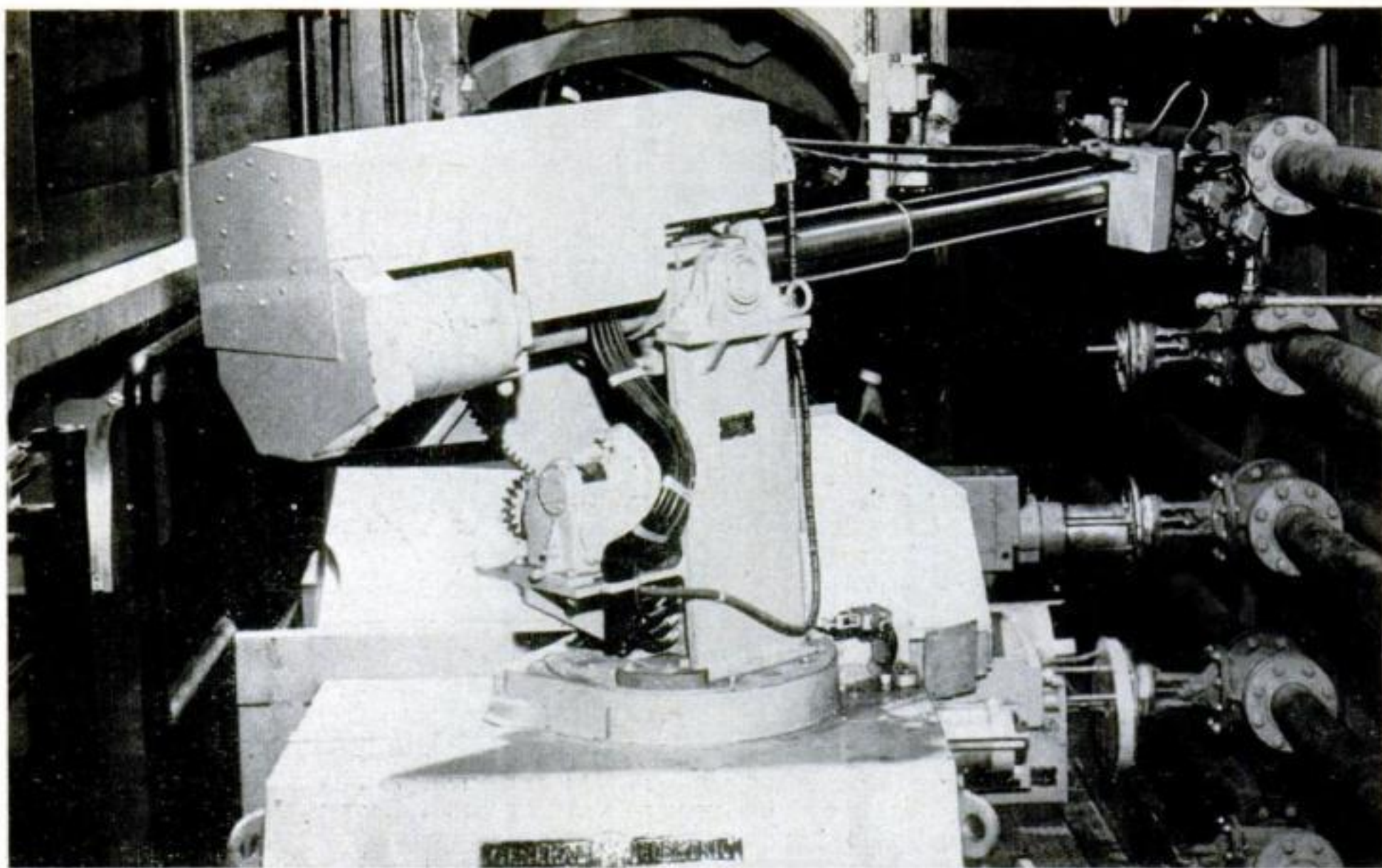
Models Show Way to Hide Antennas

AT THE rate radio aids have been added to aircraft, it is a wonder that their interiors don't look like overstuffed radio stores—and their exteriors like antenna-quilled flying porcupines.

The reason they don't is that electronic engineers have kept pace in the laboratory, simplifying the sets and hiding the speed-wasting external antennas (PS, Oct., '49, p. 169). Fortunately, the laws governing the behavior of electromagnetic waves have permitted them to scale down both radio waves and the airplanes, so that the research can be done with models.

Already many of the answers found by Stanford Research Institute scientists in miniature have been incorporated in full-scale aircraft—saving space and weight, cutting down drag, and simplifying life for pilots and radiomen.

These Stanford scientists also are developing new kinds of electronic devices for tuning the new antennas easier and faster, and to filter outputs of the various gadgets so they don't interfere with each other. **END**



Five-ton robot on wheels sticks out its arm to turn a "hot" valve in Hanford plutonium plant.

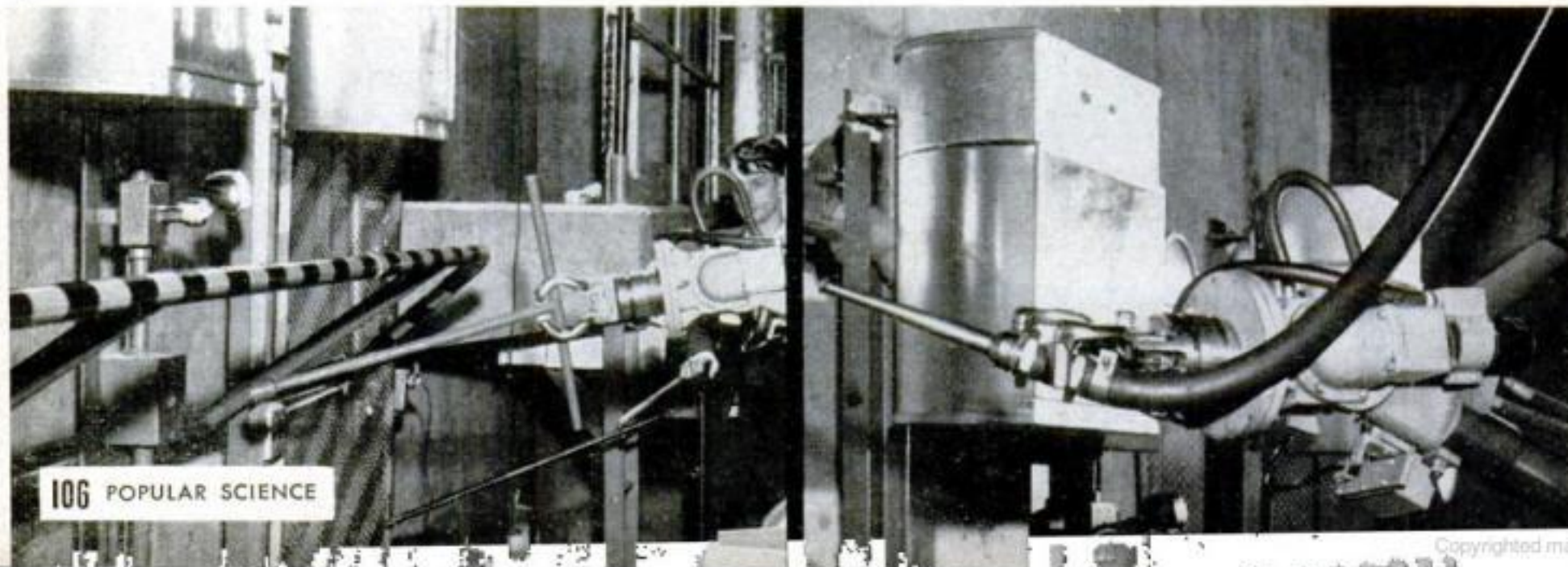
One-Armed Robot Tackles Hot Jobs

A ONE-ARMED robot is turning the valves in the giant plant at Hanford, Wash., that makes A-bomb plutonium out of uranium. The new robot looks like a railroad handcar with a small Navy gun on top. It has no fancy name, just the unimaginative title "tool dolly." But it can do practically anything the human arm can do, and it can go where human arms can't go—into areas swarming with invisible, deadly radiation.

Operated either remotely or from the dolly itself, the robot can move around on its track; raise, lower, or extend its arm (the "gun"); and grab, twist, or bend with its claw hand. The dolly easily takes apart machinery—and puts it back together again—opens and closes doors, and works with all kinds of tools. Engineers of the General Electric Co., which runs Hanford for the Atomic Energy Commission, developed it.

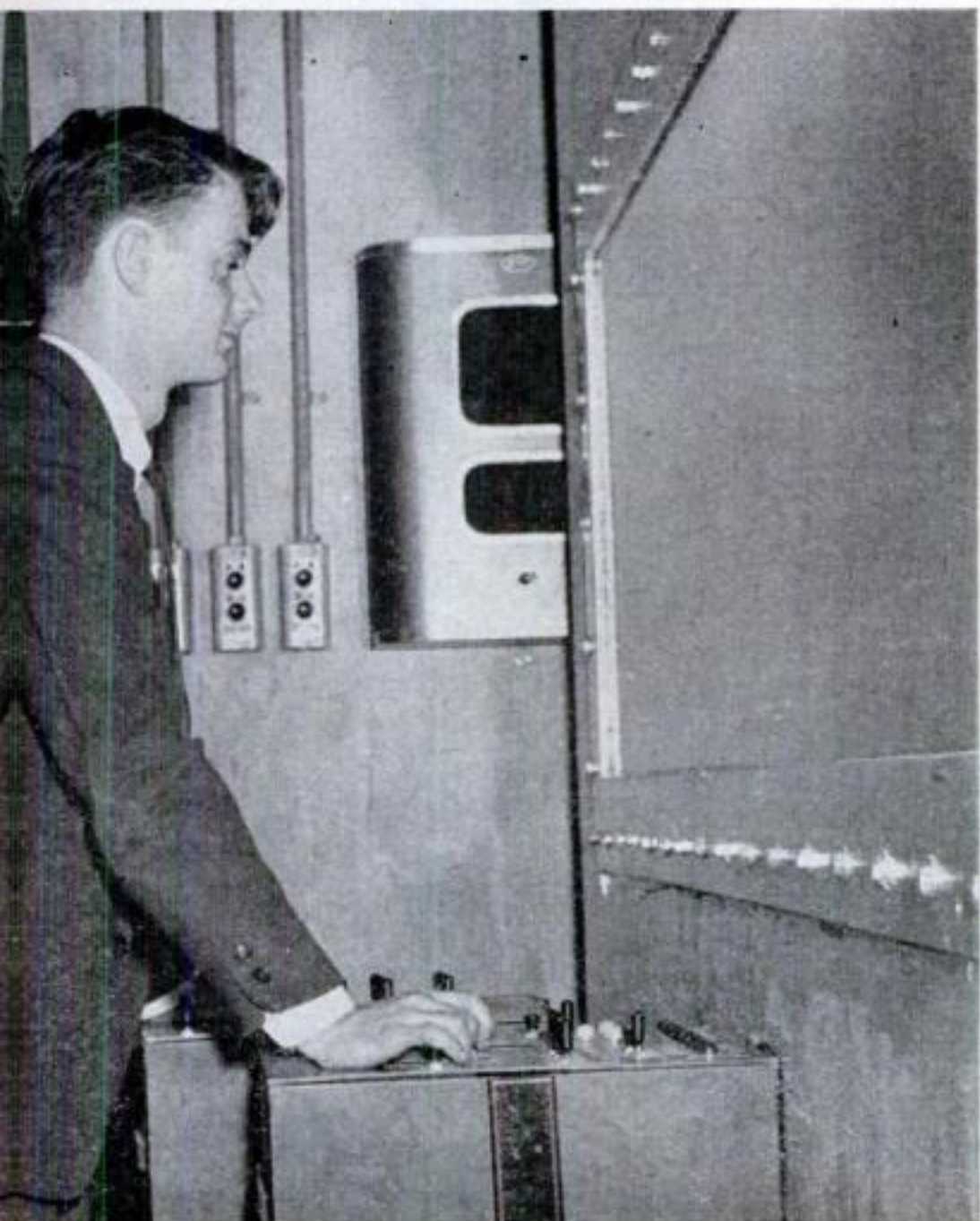
Typical job for robot is spinning nuts with wrench. Its wrist can bend and rotate, fingers can grasp—even pick up a dime from the floor.

Fire? Robot grabs hose, aims water wherever operator—safely far away—wants. Everyday jobs include disassembling, assembling machinery.





Panel on dolly lets operator work along with mechanical handy man in areas of mild radio-activity. Big mirror, adjusted by remote control, keeps hand in view of operator at all times.



For really hot work, robot is operated from shielded room. Signal lights on controls connected to feelers on hand tell when hand is in right position. Operator need not see work.



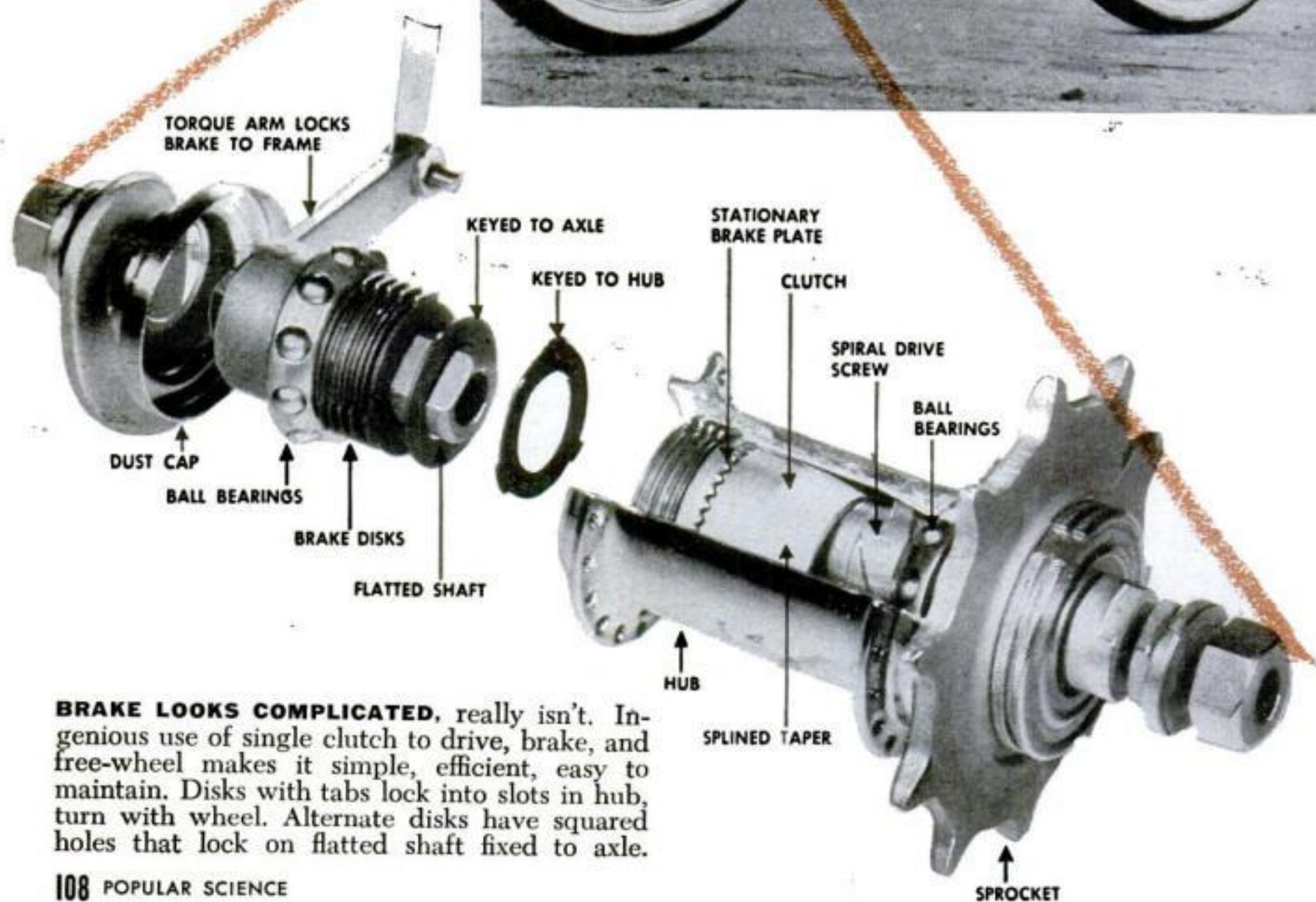
Brushes Make Golf Turf

THE practice golf tee above is the newest Fuller brush. A mat of green, water-resistant Tampico fibers, it has the appearance and texture of natural turf. Eighteen replaceable brush strips, gripped in steel channels, fit into magnesium holders that are fastened to a hardwood base. The Turfmaster may be buried or set into a platform.



Toe Triggers Transplanter

TRANSPLANTING small-stemmed plants is easy with this new garden tool, the Press-Toe. A hole is dug by pressing a square cup into the soil, as at left. The tool is then pressed into the earth around the plant to be moved (right). With the plant lifted out, a flip of the toe drops it into the hole. Pearne and Lacy Machine Co., Los Angeles, sells the tool for \$2.95.



BRAKE LOOKS COMPLICATED, really isn't. Ingenious use of single clutch to drive, brake, and free-wheel makes it simple, efficient, easy to maintain. Disks with tabs lock into slots in hub, turn with wheel. Alternate disks have squared holes that lock on flatted shaft fixed to axle.

How a Coaster Brake Stops a Bike

By Sheldon M. Gallager

EVERY time your bike-riding youngster slams on the brake on a steep hill or at a traffic crossing, a small but powerful mechanism inside the rear-wheel hub brings the bike to a fast, safe stop.

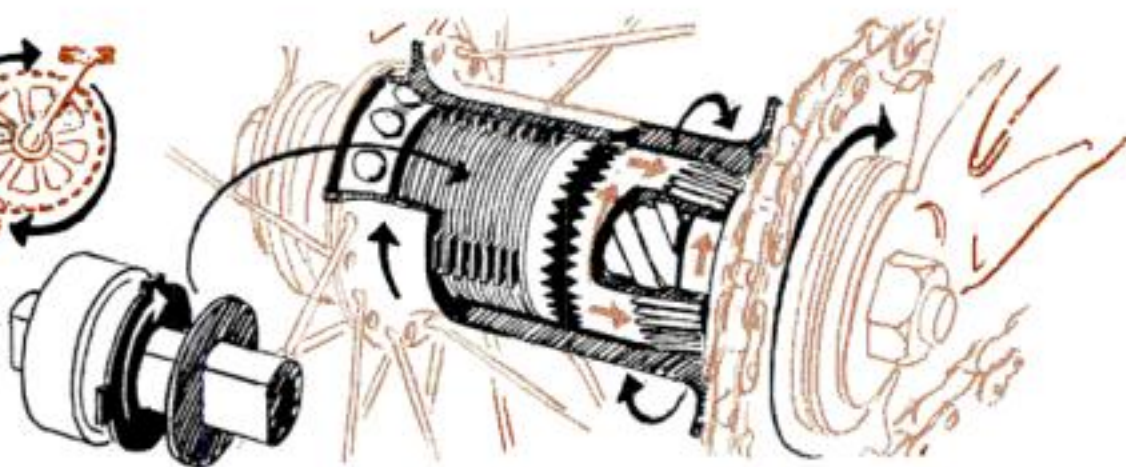
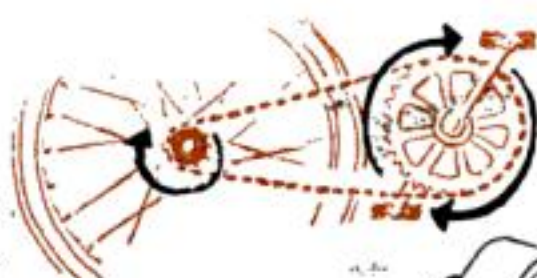
This intricate device is the coaster brake known casually by two generations of present and former teen-agers. It consists of a cone-shaped clutch sleeve that rides back and forth on a spiral drive screw, turned by the sprocket. When the clutch moves to the right, it engages the wheel hub, driving

the bike. When it moves to the left, it engages the brake. In between, it engages neither, and the bike is free to coast.

In the New Departure model shown, the brake mechanism is an ingenious arrangement of 21 steel disks. Eleven disks are keyed to the axle, which is held stationary by a torque arm secured to the bike frame. The other 10 disks are keyed to the hub and rotate with it. When the clutch squeezes the disks, the fixed ones pinch the rotating ones, slowing the bike. * END

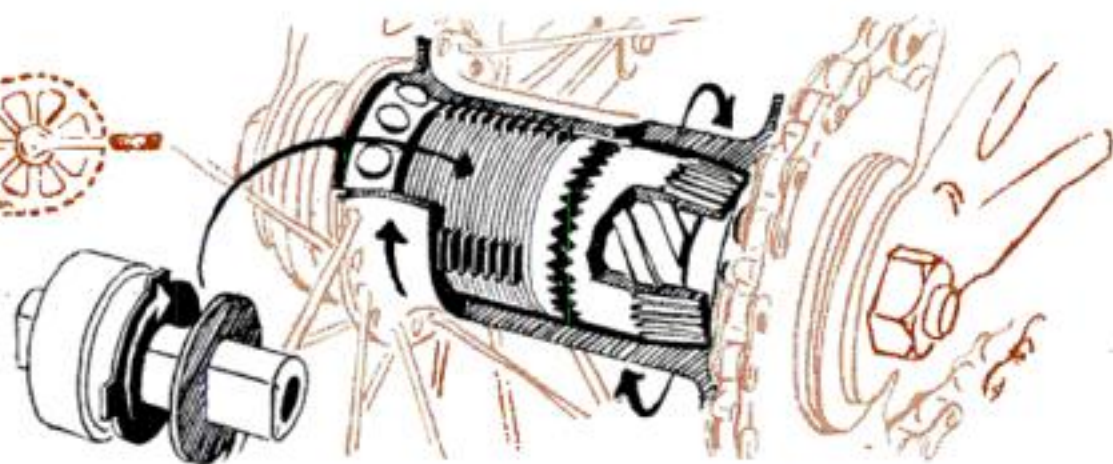
PEDALING

WHEN PEDAL is pushed forward, it turns spiral drive screw in clockwise direction, forcing clutch to move sideways to the right until its tapered end engages inner surface of hub. Locked to hub, clutch then turns wheel forward.



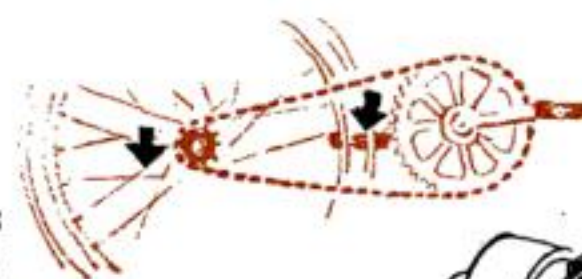
COASTING

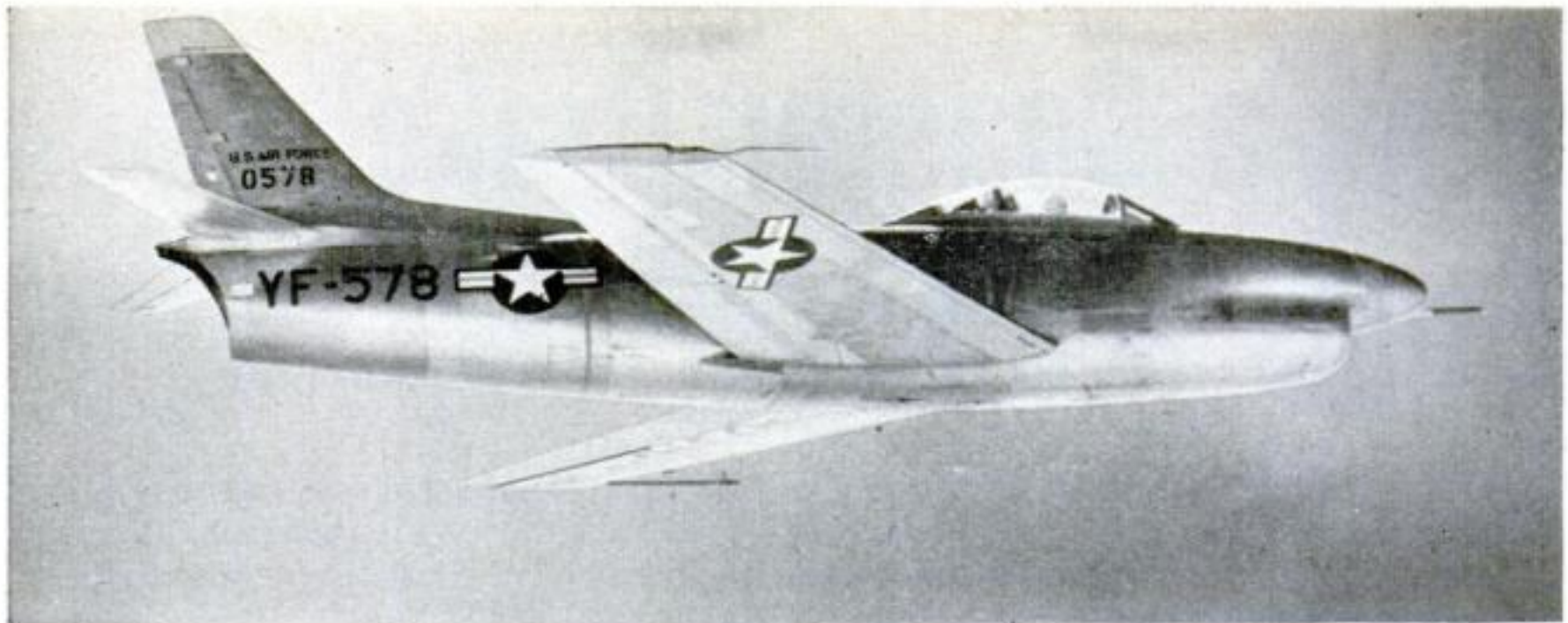
WHEN FORWARD pressure on pedal is released, clutch disengages hub, and bike is free to coast. As in pedaling, brake disks remain slightly separated so moving ones keyed to hub slip easily between fixed ones keyed to axle.



BRAKING

WHEN PEDAL is pushed backward, it turns drive screw counterclockwise, forcing clutch to the left against fixed brake plate. Locked against turning, clutch then compresses disks, pinching moving ones between fixed ones to slow bike.





Record-Breaking Jet Fighter Gets Big Twin

THE new Air Force F-95A interceptor above is expected to outperform its smaller brother, the North American F-86 Sabre that holds the world's speed record of 670

m.p.h. A more powerful J-47 jet engine, housed in a fatter fuselage, plus an afterburner, give quick climb. Air-intake duct is under a longer nose that holds radar.

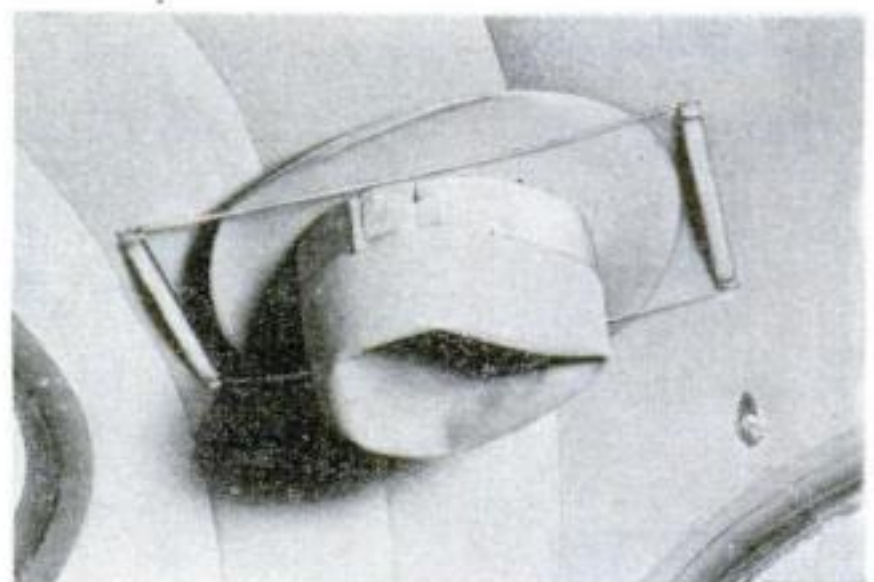
Box Spreads Mortar Evenly

TURN the crank handle of the steel box at right, and it rides along a wall on small wheels, forcing out behind two small streams of mortar that are spread evenly. Helper follows, putting the building blocks in place. The inventor, Jack Wegner, of Pullman, Wash., turning the crank of his machine, claims it will eliminate costly waste. Using ordinary methods, he says, the mortar is spread on thickly and unevenly, with more than half oozing out between the blocks and dropping to the ground.



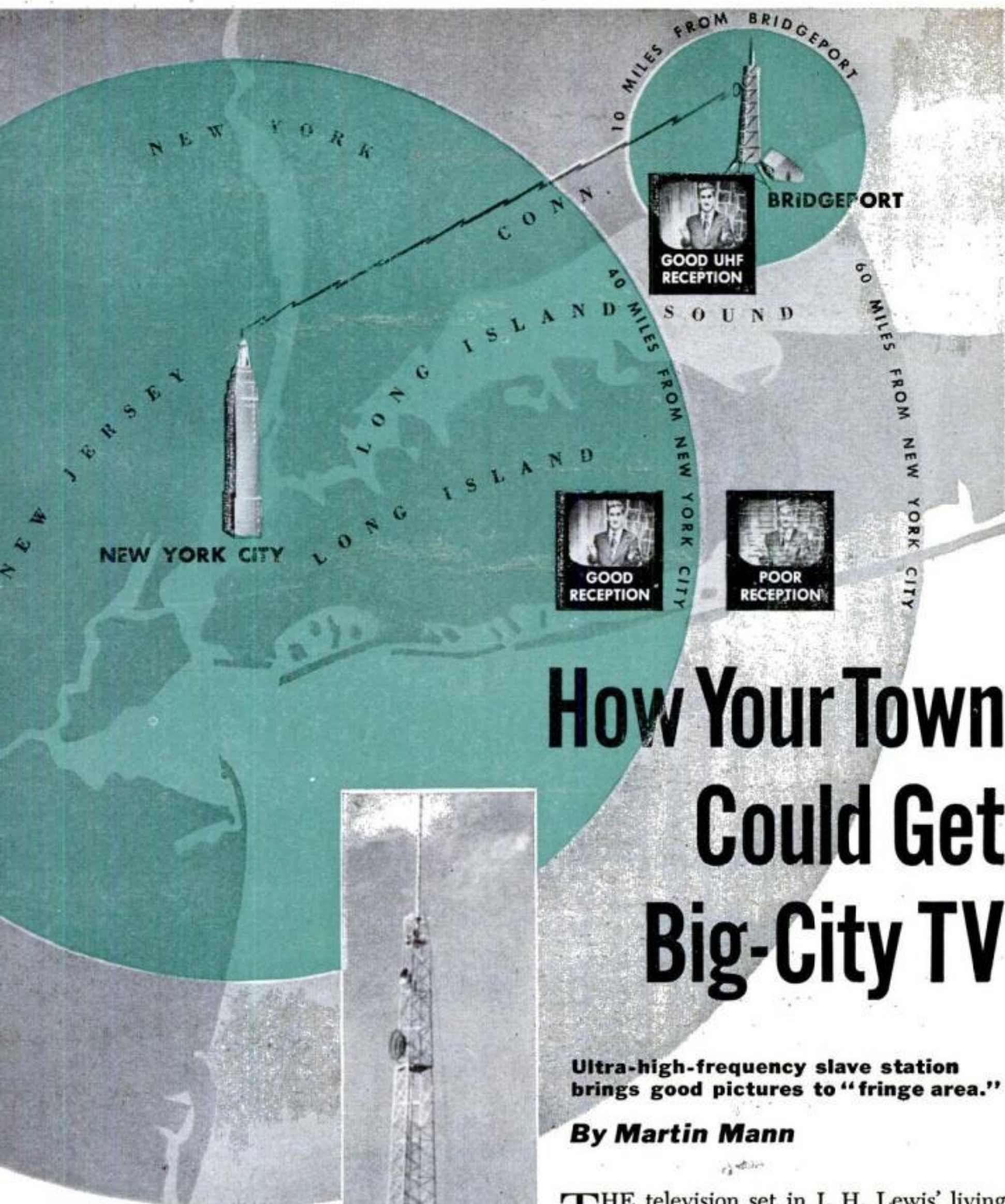
Nozzle Sprays Foglike Mist

THIS brass garden-hose nozzle, for spraying seed beds and young plants, atomizes water into a gentle, foglike mist that won't wash away soil or fertilizer. Available from Fogg-it Sales Co., Downey, Calif., for \$1.95, the nozzle has a three-hole spray head.

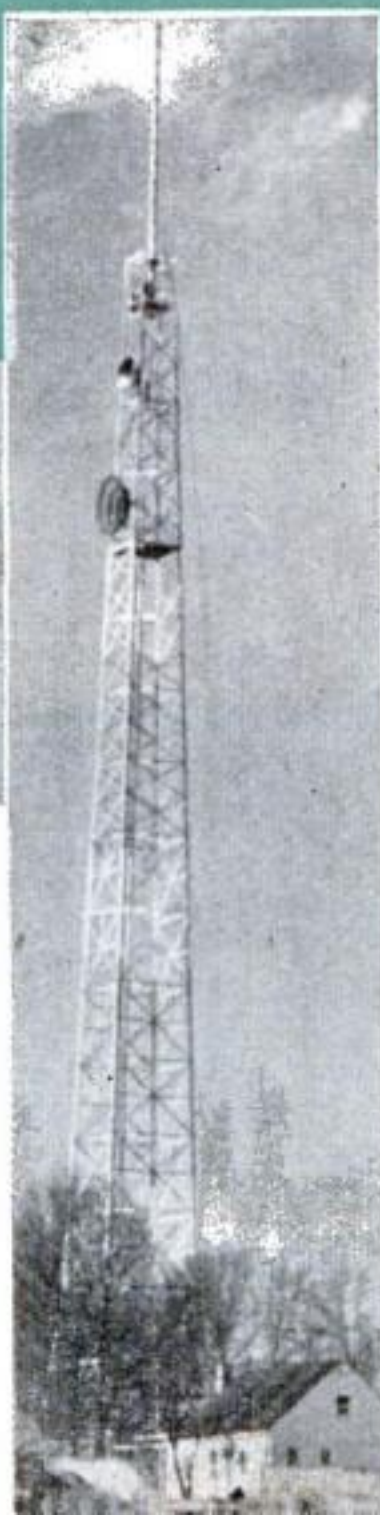


Hatrack Pins to Car Top

The elastic-wire hatrack above is a convenient holder for your hat, maps, or box of cleaning tissues while driving. It is easily installed on the inside roof of a car by pins attached to the end bars. The Auto Hatrack Co., Denver, Col., sells it for 69¢.



BRIDGEPORT, too distant for good reception of New York TV (see map), gets one station's programs re-broadcast from its own UHF experimental station (photo at right).



How Your Town Could Get Big-City TV

Ultra-high-frequency slave station brings good pictures to "fringe area."

By Martin Mann

THE television set in J. H. Lewis' living room, in Bridgeport, Conn., looks like any other—until you notice two extra knobs. Turn them and you get shows from WNBT, the National Broadcasting Co.'s New York station, but not from New York. These are being picked up from an experimental—and perhaps very important—ultra-high-frequency station in Bridgeport.

Mr. Lewis is one of the hundred or so

AUGUST 1950 III

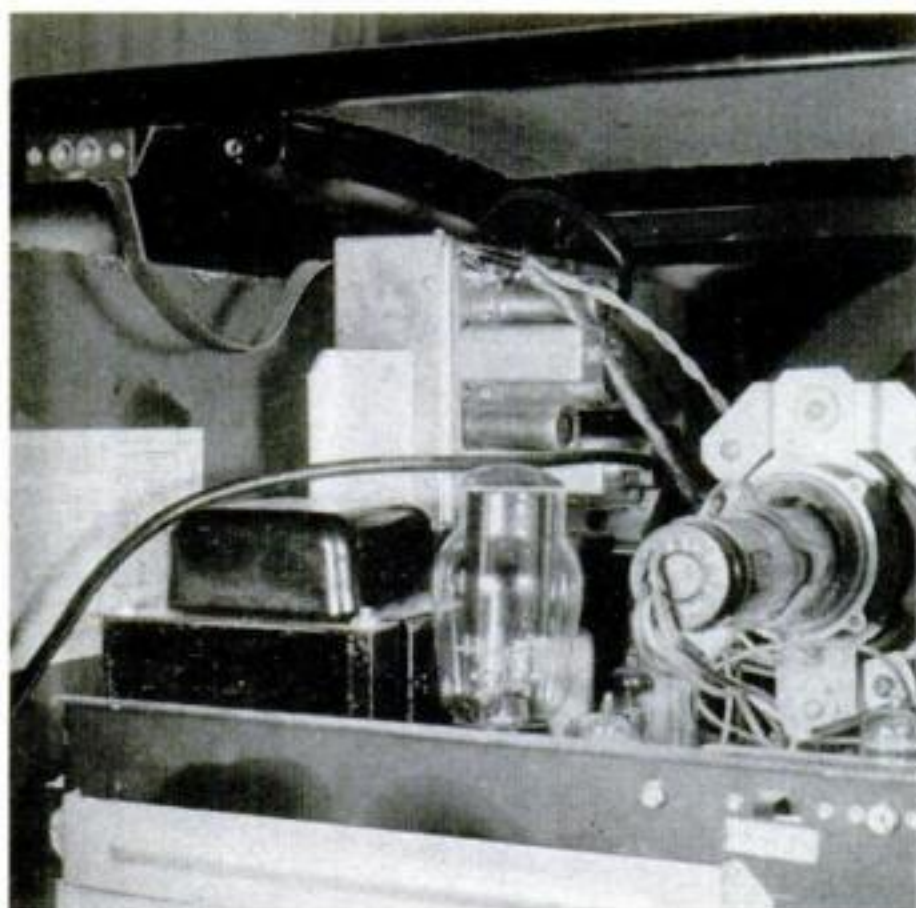
people cooperating with RCA in the first big test of UHF television—a test that may determine the future of television. For UHF promises to bring good video reception to people who now can't get it.

Take Bridgeport, for example. There are 200,000 people in that area, apparently all crazy about television. But they are some 50 miles from New York, just beyond the region of good reception. To pick up New York they must often spend up to \$100 for antennas on tall masts.

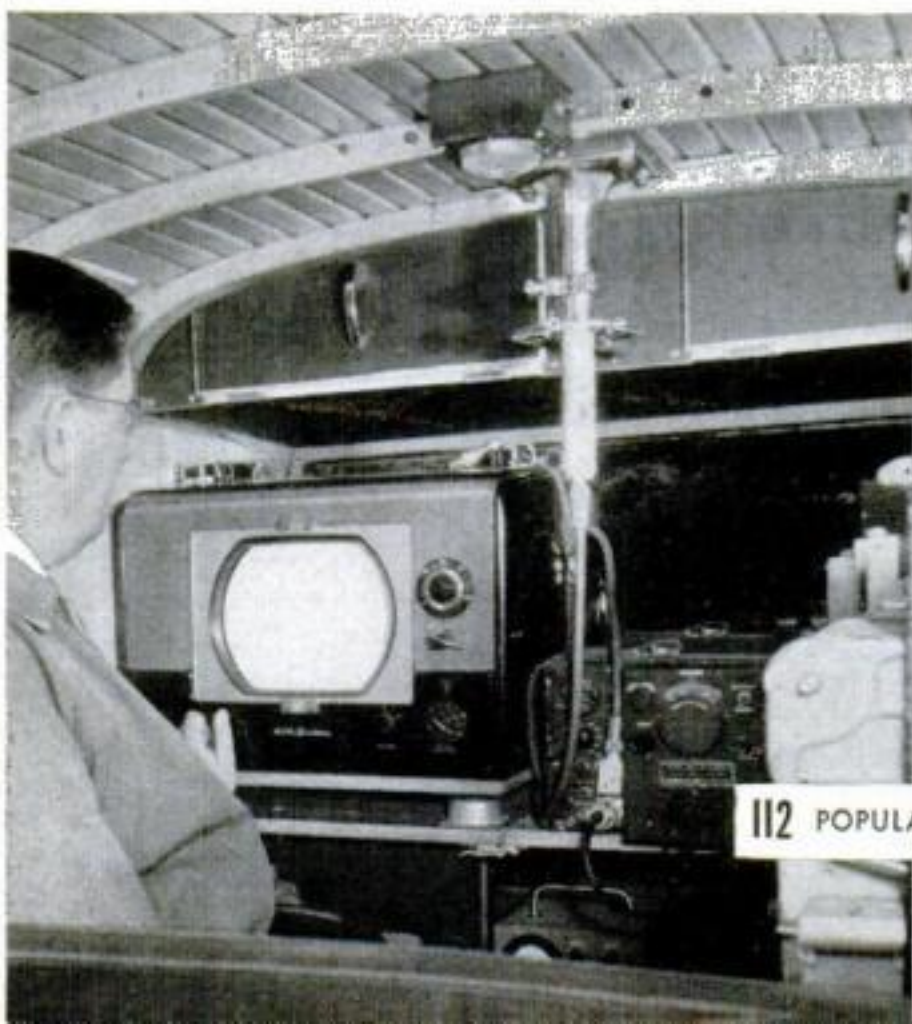
And what they get for their money is apt to be poor indeed. Some stations fail to come through at all. Those that do usually give bleary pictures badly broken up by interference. It's like watching a show through a car windshield smeared with mud.

Why don't Bridgeporters build their own stations, then? That's where UHF comes in. With UHF, they could. Without UHF, they couldn't.

The reasons are complex enough to give the Federal Communications Commissioners



ABILITY OF UHF to cover area is gauged at various heights with antenna mounted on extension ladder (right). Truck carrying ladder also tows instrument-loaded station wagon. Test equipment includes standard TV set converted to receive UHF (below). Two extra knobs on upper right face of set are only visible change. Converter itself is inside cabinet (it is shown on its side in upper center of photo above). This conversion job is one of two types RCA has installed in about 100 private homes in the Bridgeport area.



the harried look of a TV-set manufacturer who bet his bankroll on seven-inch screens. As the radio space is now divided up, a part of the very-high-frequency range (54 to 88 and 174 to 216 million cycles) is allotted to television. This provides room for only seven television stations in any one area. All seven are built and operating in New York. Nobody can build another one within about 80 miles—interference would be hopeless, since the radius of severe interference is about twice that of useful reception. So Bridgeport is out of luck.

But farther up in the radio space, the *ultra* high frequencies are not yet divided up. Tentatively, the space between 470 and 900 million cycles has been assigned to experimental TV—enough room for a couple of dozen video stations. So Bridgeport—or anybody—could have a UHF station without getting into its neighbors' hair.

Bridgeport May Tell the Story

UHF is still largely unexplored territory, however. Nobody is sure just how receivers and transmitters up there should be designed, what kind of antennas to use, how far a good signal can be broadcast, what effect weather has, or the answers to a list of other questions.

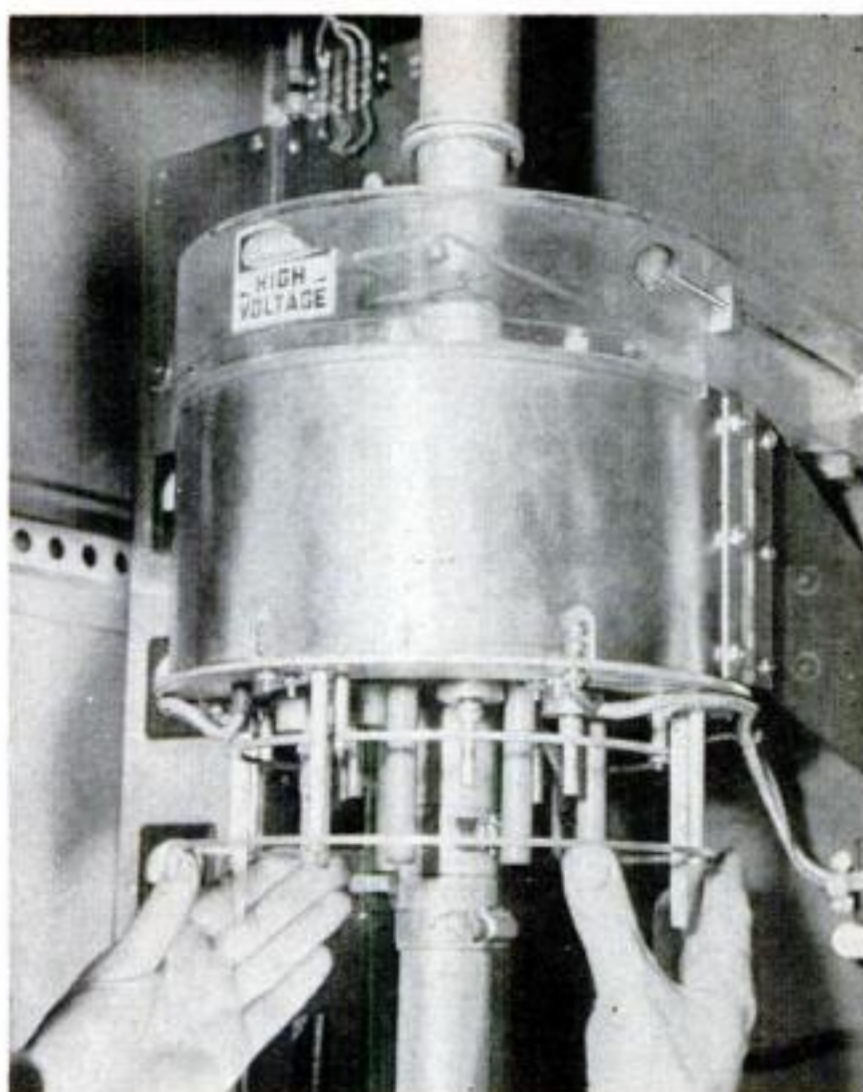
Some of these answers RCA hopes to get from the Bridgeport test. Two other experimental UHF transmitters are also being operated by different organizations, one in California and one in the Midwest.

Bridgeport's guinea-pig station, KC2XAK, looks deceptively standard. A white cottage nestles in the shadow of a 250-foot antenna tower atop one of the hills overlooking the city. Inside you see a control console and shiny metal cabinets of equipment similar to those in any TV station.

For, actually, the transmitter equipment is a standard RCA type modified for UHF. The most noticeable change is the addition of big tubes—similar to those used for radar—that provide the ultra high frequency by doubling their input frequency. Identical tubes provide final amplification.

KC2XAK is unusual in another way: it has no studios. There's not a single television camera and only one microphone—in a storage closet—for station-identification announcements. For this station is a "slave," simply rebroadcasting the programs of its "master," in this case WNBT of New York.

Pictures are relayed over a microwave link from WNBT's Empire State Building



TUBE like ones used for radar produces ultra-high-frequency waves. It is tuned by changing size of cavities (above). Except for these special tubes, transmitter is largely standard.

transmitter station to a dish antenna near the top of the Bridgeport tower. The sound is simply picked out of the air by a regular TV receiver and rebroadcast.

This slave, or satellite, operation is a major part of the Bridgeport experiment. Costing only a small fraction as much as a standard TV station to set up and run, it is showing one way to bring video within the reach of smaller communities. Of course, a slave could choose its programs from several masters, instead of always rebroadcasting one, as KC2XAK does.

KC2XAK serves one of the most exclusive audiences in the TV world. Only about 100 people have sets equipped to pick it up. A few use specially designed UHF receivers. Most of them, however, have simple converters attached to the standard TV sets they already owned. The converters, UHF antenna installations, and service are supplied free by RCA. In return, the householders like Mr. Lewis fill out reports on the quality of the UHF reception, and put up with frequent calls from service men, engineers, and visiting firemen like your *POPULAR SCIENCE* reporters.

RCA has designed two different types of converters. One is a complete UHF

"front end." It picks up the UHF signal and feeds it to the intermediate-frequency circuit of a standard set, by-passing the standard front end. This type, concealed inside the cabinet, is the one Mr. Lewis has.

The other type, called a Pan converter after its inventor, Dr. T. Y. Pan, merely reduces the ultra high frequency to the frequency of one of the standard TV channels (channel 12 in the Bridgeport test). The signal then goes into this channel on the set and passes through the entire set in the normal way. Both units, using about five tubes apiece, provide some extra amplification. RCA won't talk about price.

Although RCA operates the UHF station, other companies are using its broadcasts to test their receivers. Zenith, in particular, has set up about a dozen UHF-adapted sets in homes in the area. These sets, a type already on the market, are converted by simply adding one coil to the tuning unit.

When commercial UHF television will come depends on several things. Many tests like the one in Bridgeport must be completed. The decision on color might also have an effect, for the Federal Com-

munications Commission may want to set aside some UHF space for color-only stations.

How good is UHF television? The Bridgeport experiment is only seven months old, so final results can't be expected yet. Thus far, transmission seems simple enough. KC2XAK, run by only one operator, has encountered no serious trouble.

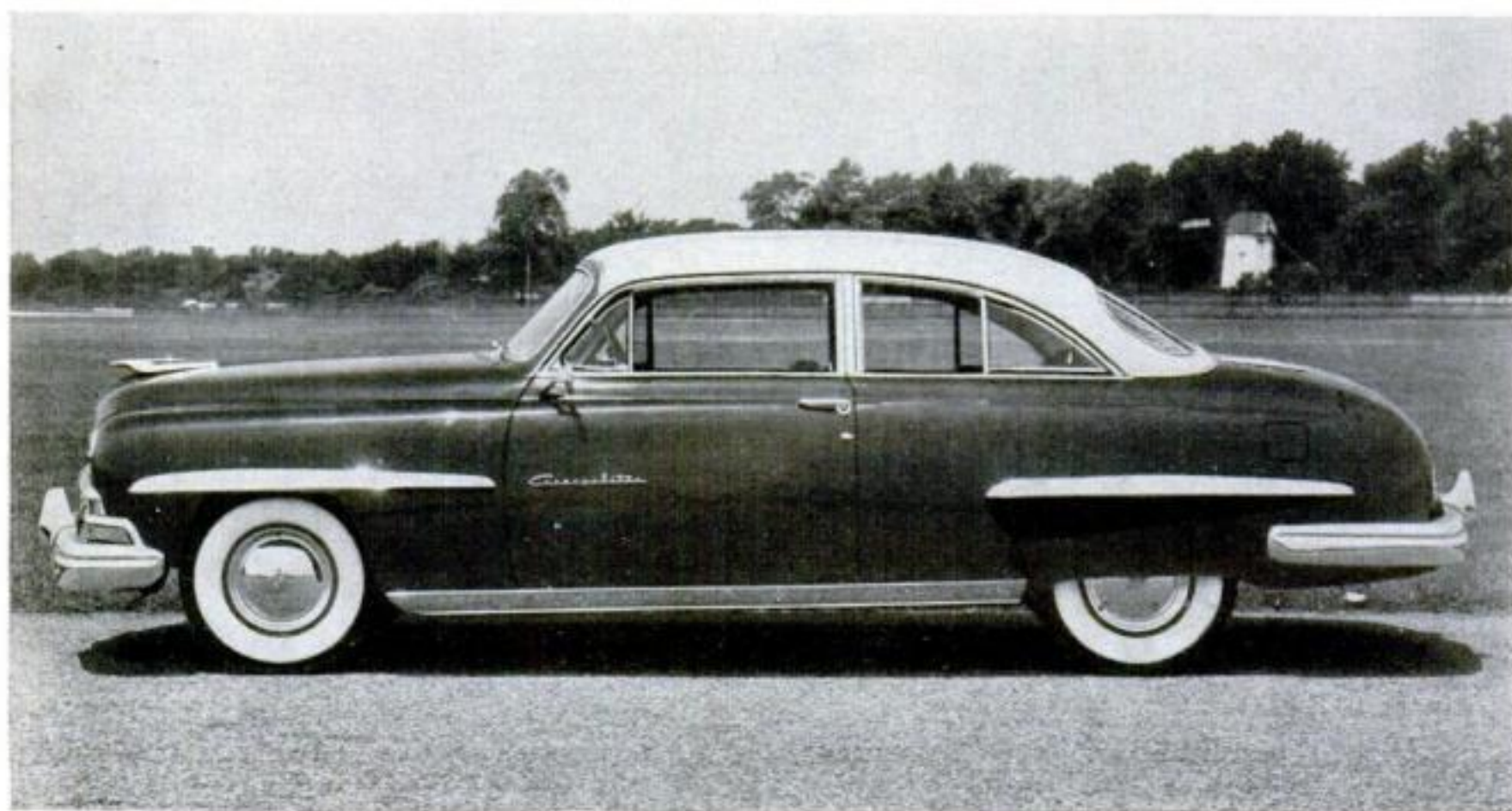
Reception is good. Pictures are as clear and steady as standard TV gives in New York City itself. But this is true only close to the transmitter, even though it is several times as powerful as most TV stations. Pictures RCA classes as "good" are now rarely received beyond about six miles (standard TV covers a 40-mile radius quite easily). But antenna design and location are even more important for UHF than for standard TV, and better installations may extend this limit.

The short range of UHF might really be an advantage. Transmitters could be located fairly close together without interference, making it possible for almost every town to have its own station. Then television for everybody, everywhere, would be in sight—technically at least. END

Hard-Top "Convertibles" Have Customized Styling

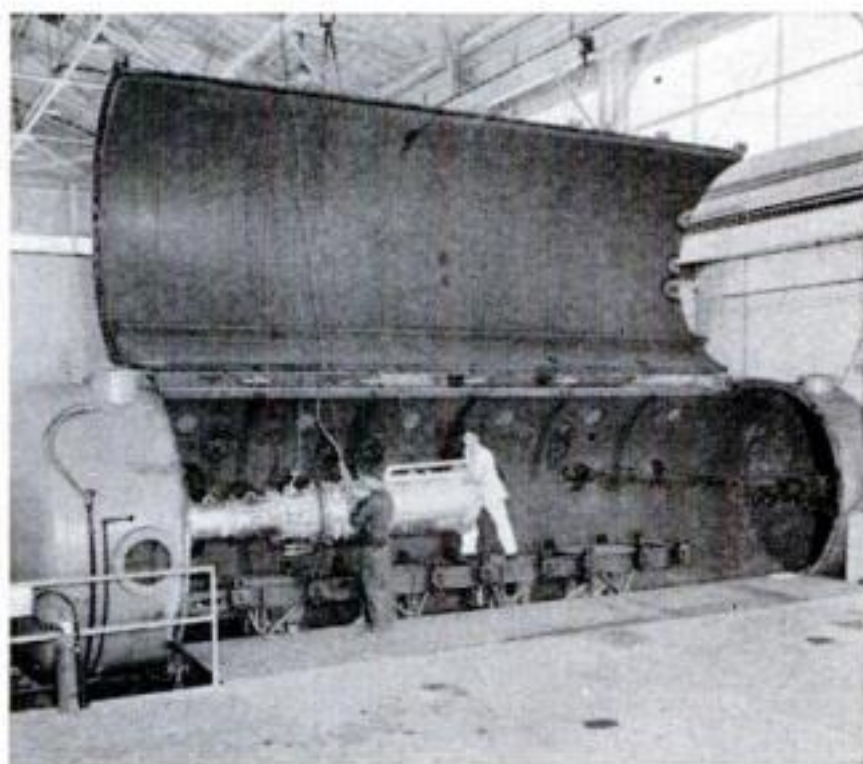
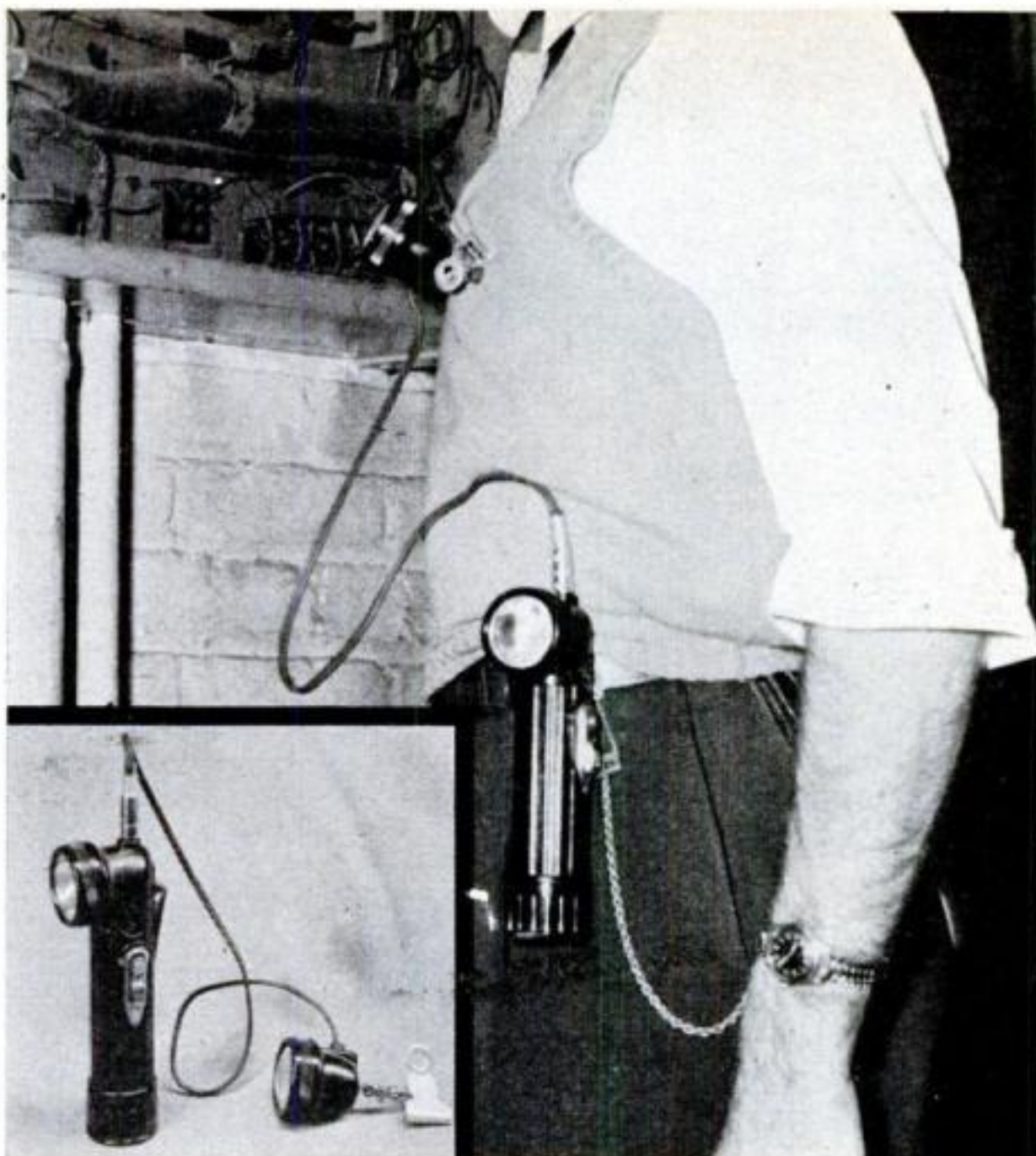
THE Lincoln-Mercury division of Ford is now marketing three new hard-top "convertible" coupes for style-conscious motorists who like cars with distinctive appearance. The "customized" cars feature vinyl-plastic tops over the standard steel tops, extra chrome trim, fancier instrument panels,

two-tone leather upholstery, and special color schemes. They have special names, too—the Mercury Monterey, Lincoln Lido, and Lincoln Cosmopolitan Capri (below). All three have special steering wheels and twin outboard rear-view mirrors. They are slightly higher in price.



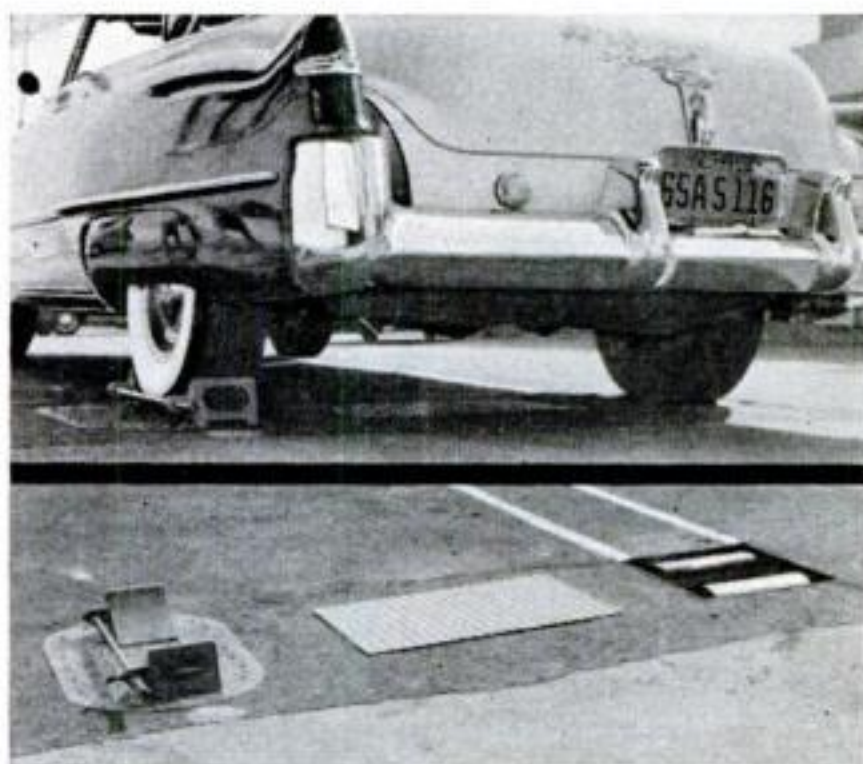
Flashlight Shines Two Ways

A TWO-HEADED flashlight, shown in use at right, is the telephone repairman's newest tool. The case is like an ordinary flashlight's except for a socket into which you can plug a 3½-foot extension cord feeding a second lamp. Both lights draw power from the two standard cells in the flashlight. The extension, with a floodlight lens, is swivel-mounted on a spring clamp that can be hooked to the user's clothing or any convenient structure. The flashlight itself, with a belt clip, serves as a spotlight. Bell Telephone Laboratories designed the double-duty light, and Gits Molding Corp., Chicago, makes it.



Ramjet Flies High on Ground

THIS full-scale ramjet engine is being lowered into a test chamber that can take it on simulated "flights" 20 miles up and at speeds four times faster than sound. Developed at the Navy's Ordnance Aerophysics Laboratory in Texas, the chamber, first of its kind, is 125 ft. long and 10 ft. in diameter. Steam for its vacuum system would supply electricity for a city of 100,000; 30,000 gal. of water a minute cool it.



Car Bouncer Spots Squeaks

THIS device, imbedded in a concrete floor, allows a mechanic to locate the source of rattles and squeaks in a car by simulating road conditions without leaving the garage. The left-hand unit holds one rear wheel secure, while the other wheel rotates between two steel rollers. One of these has bumps in it that jounce the car as would a rough road. The apparatus is made by the Western Tool and Engineering Co., Los Angeles.



Road racers, bunched at the start, above,



Slithering around a loop of twisting roads, these agile sports cars compete in a revival of early highway races.

By Bill Reiche

PS PHOTOS BY W. W. MORRIS

IF AMERICAN stock cars of 1955 are better performers than current models, I vote we credit a thousand gentlemen amateurs who are intensively seeking to "improve the breed" of automobiles.

They are sports-car drivers, who several times a year conduct road races to prove that an automobile may be a thing of swift performance, rather than the spongy, soft-

riding child of chrome mated with bulge.

Racing against each other and the inexorable sweep of a stop watch isn't all sports-car drivers do. You've probably seen them darting along the highways in their beautifully engineered cars. In these watch-charm racers they often seem to be going much faster than they are. Motorcycle cops tend to jump to the conclusion that, because a sports car is capable of bettering 100, it does so constantly. Actually, sports-car drivers as a group don't attempt top speeds on traveled roads any more than Lily Pons feels it necessary to hit her top note when calling a cab. Everybody knows they *can* do it.



soon spread out. The Ferrari, far left, won, and the Frazer-Nash, foreground, was third.

Tests Both Cars and Men

However, several times a year in different parts of the country the man with the heavy accelerator foot does have his day. Then, under conditions of maximum safety for driver and spectator alike, he gets his chance to open her up in a road race. This is a flavorful kind of competition, older and more exacting than circling a race track.

More than 80 drivers and cars were entered in recent races at Bridgehampton, New York, where I watched them compete in six classes over a closed, four-mile stretch of two-lane road. On such an occasion even the uninitiated may see why some overseas manufacturers lavish loving care on building precision mechanisms, why owners in-

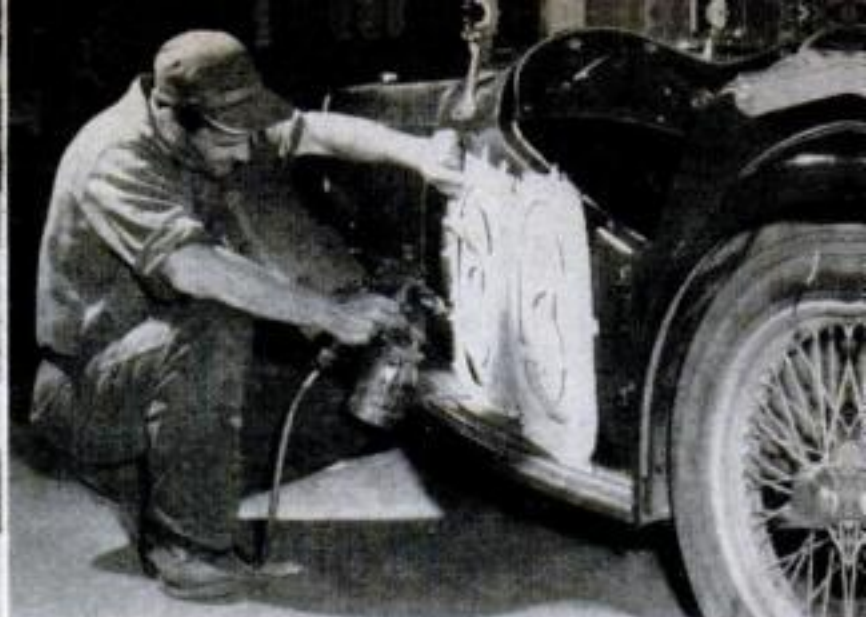
Skilled mechanics go all out trying to complete the installation of a new engine in a Meyer Special the night before the race. They did and it placed second in its classification.



NO.	DRIVER	CAR	TIME RECORD	O.K.	REMARKS
		ITEM			
		WARRANTY SIGNED			
		ENTRY PAID			
		IN REG.			
		DRIVERS MEETING			
		LIGHTS TAPED			
		HORN			
		STOP LIGHTS			
		BODY MEAS.			
		CRASH HELMET			
		GOGGLES			
		MIRROR			
		EM. BRAKE			
		SAFETY BELT			
		DOOR LOCKS			
		STEERING			
		TIRES			
		LOOSE PARTS			
		LEAKAGE			
		FUEL TEST			
		NUMBER			



An Austin driver offers his crash helmet for approval at the inspection station. His goggles must also get an okay from AAA officials.



The sports car that brought the driver to the scene takes on the appearance of a racer when its identifying number is sprayed on.



A Healey fails to come out of a turn as planned and plows through the protective bales of hay, dislodging a fender. The car was pushed back on the road and finished the ten-lap race.

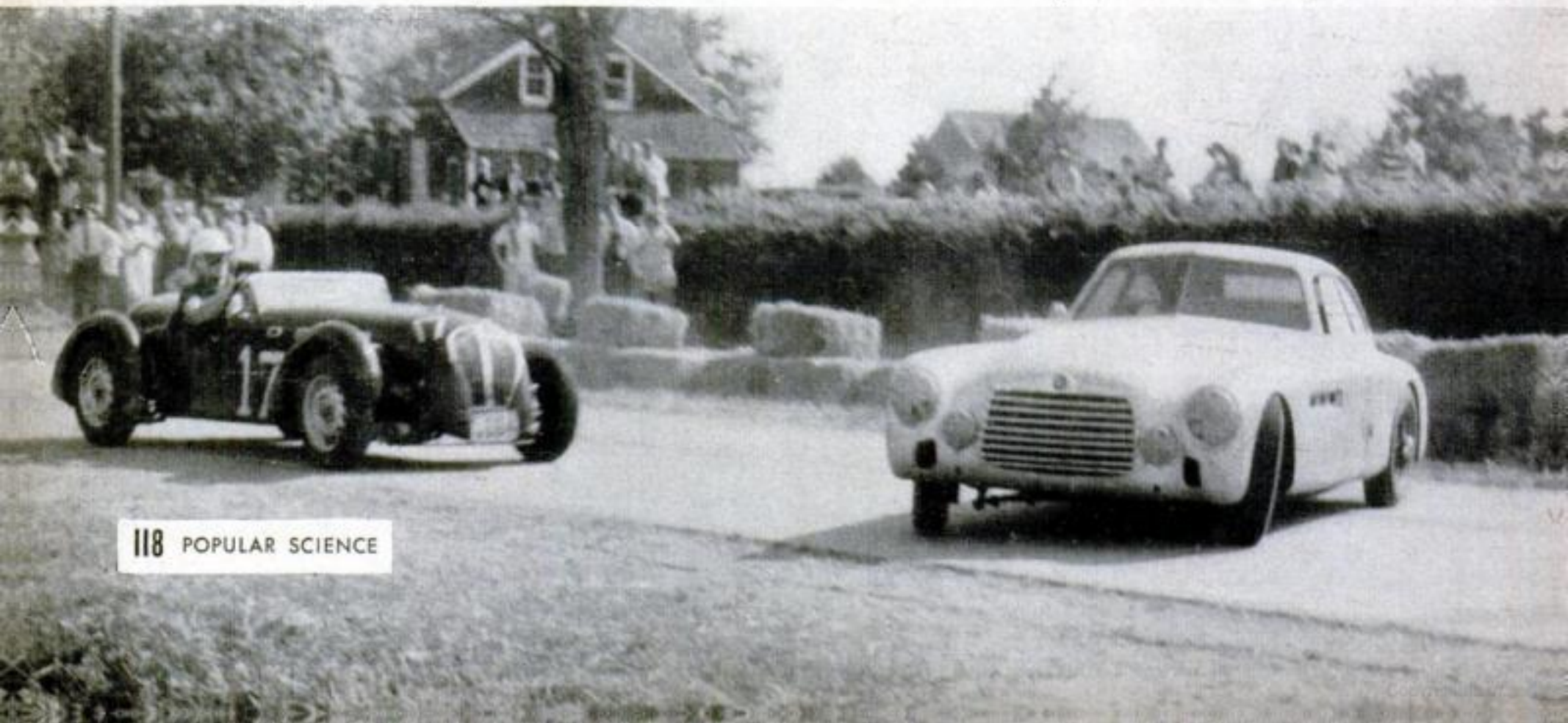
The same car, left fender gone, comes around the same turn later and appears to be headed for a broadside collision with an Alfa Romeo that is coming out of a spin. The AR, driven

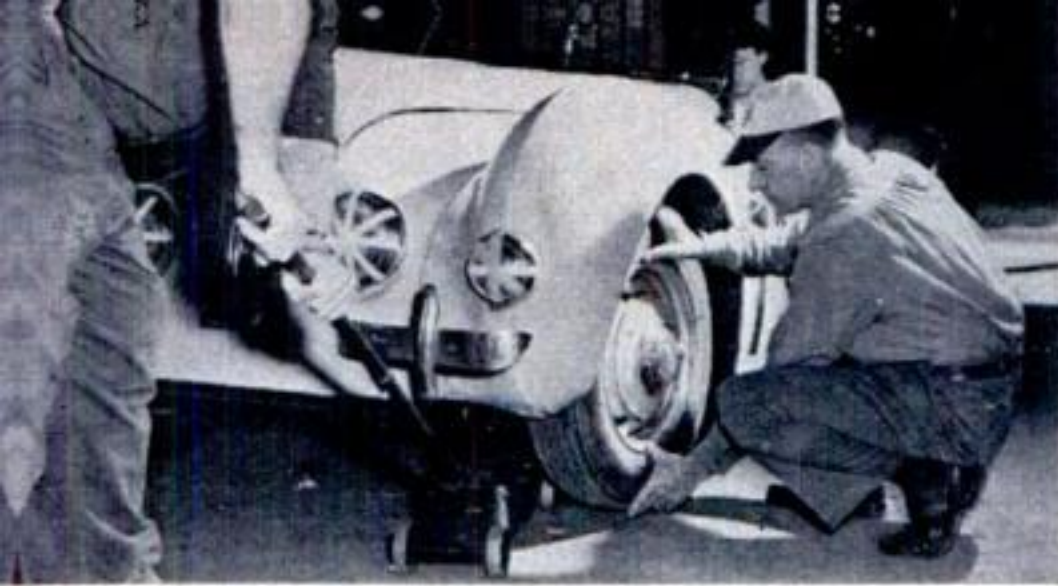
vest substantial sums in them, and why drivers risk their necks in hot competition.

A road race is a spectacle that appeals to practically every one of the senses. The cars have a cool, functional beauty that bespeaks quality and class. The straight pipes of their exhausts mutter modestly that here are engines tuned with loving care; then scream it out like boastful small boys as they accelerate. These racers have the smooth, solid feel of a stake horse in the paddock. They smell like automobiles anywhere, except for the oldsters that still use castor-oil lubrication. You can even taste the race when a car on the shoulder of the road envelopes you in tar-flavored dirt.

Drivers and cars must meet high standards of fitness. The American Automobile Association, under whose jurisdiction the races are run, registers the men (women are barred from road racing) after a driving examination. They must sign waivers

by Antonio Pompeo, who is one of the oldest drivers in road racing, was no sitting duck in this instance and went on its way unscathed to nail down second position in its classification.





Perfect steering mechanism is essential for the safety of drivers and spectators. Here wheels are carefully checked on a Healey. Note that driving, parking lights are taped.

clearing the sponsors from responsibility and carry heavy insurance to cover spectators and themselves in case of a mishap.

An official inspection station checks the cars. Lights must be taped, and reversed if possible, to minimize the danger of flying glass. Emergency brake, stop lights, and horn must be in good operating condition (though few drivers could hear a horn during a race). A safety belt must be fastened to the frame of the car, rather than to the seat, door latches must be secure; and running gear and fuel tanks must pass close scrutiny.

In most races fuel is tested to guard against speed-inducing alcohol mixes. At Bridgehampton, because of the heavy entry list, it was not possible to check the fuel. Drivers were put on their honor. If this seems naive, it must be remembered that sports-car racing is considered by its participants to be a gentlemen's sport. This is not

So great is the acceleration of this winning Cadillac-powered Allard that as it straightens out from a turn its sheer power lifts the front wheels from the ground. With these cars, noted



Driver's pit crew watch the road and a stopwatch. Number on sign held by man at left indicates laps completed; a lower number, not visible, indicates his position in the race.

meant as snobbery; the emphasis is on amateurism—sport for the sake of sport.

The day before a race, action starts cracking. Drivers, eager to become familiar with the roads, curves, and corners, "burn the course" interminably. Between "burns" the drivers tinker, kid each other about their skill, luck, and natural depravity, and try to worm out secrets for making cars go faster.

"Wonder how Smith is getting along with

for road-holding ability, this is a rare occurrence. This car exceeded 100 m.p.h. on the short Bridgehampton straightaways and won easily. Note air intakes projecting through hood.



that hoodoo wagon?" one will ask concerning a car that hasn't proved itself. "Hear Doakes has his M.G. blown," says another, meaning that Mr. D. has put a supercharger on his car. This expression is apt, since "blowing" increases acceleration and cars so equipped are gone with the wind.

The eve of the race finds all contestants in the Drivers' Meeting, where they are scolded, warned, and encouraged by the race chairman. (This harassed individual admits he has wires from all over the country stating, "BROKEN DOWN IN EAST OVERSHOE PLEASE DON'T SCRATCH ME.") Contestants are briefed in flag signals: red, stop immediately; yellow, slow down and hold places; green, track clear; black, stop at your pit; crossed flags, you have completed half the race; and checkered, you are finishing.

Next morning competing cars are assigned pits—roadside positions near the finish line—where tables are placed to hold tools, fuel, and spares. Here only a few minutes before the start you may hear someone ask, "What say we take the wheels off?" With some sports cars, replacing four wheels is about as much trouble as putting a new flint in your lighter.

Races generally begin from a standing start, the cars two abreast in positions drawn by lot. In the final go at Bridgehampton the racers were led once around the course and made a flying start. Sports cars are classified according to piston displacement in cubic centimeters. The range runs from 1,000 cc. for an "unblown" M.G. to 5,200

cc. for an Allard powered by a Cadillac engine, a power plant that lends itself admirably to road racing.

Speeds are impressive when it is remembered that the races are run at Bridgehampton over narrow, mostly macadam roads, with two 90° turns and one greater than that, and no real straightaway amounting to as much as a mile. Tommy Cole, a transplanted Britisher, drove an English Allard with a twin-carburetor Cadillac engine 80 miles at a fraction under 80 miles an hour. His best lap was at 83 miles an hour—and this on a circuit where you wouldn't want to push the family sedan over 35.

Sports cars—not to be confused with home-built hot rods, which are frequently unsafe for high-speed "cornering"—must meet highway specifications. They must have lights, horn, fenders, a windshield and accommodations for a spare tire. They differ from racing cars, such as compete at Indianapolis, in that they are built for rugged road conditions, hill-climbing, and negotiating sharp turns.

Sports-car activity is not confined to racing and casual touring. Under the auspices of various clubs, hill climbs, accelerations tests, and rallies are regularly held. The next road race will be at Watkins Glen, N. Y., on September 23, when the American Grand Prix will be contested over a six-mile course that has been described as "up and down, around and about, over bridges and under, with two grade crossings thrown in."

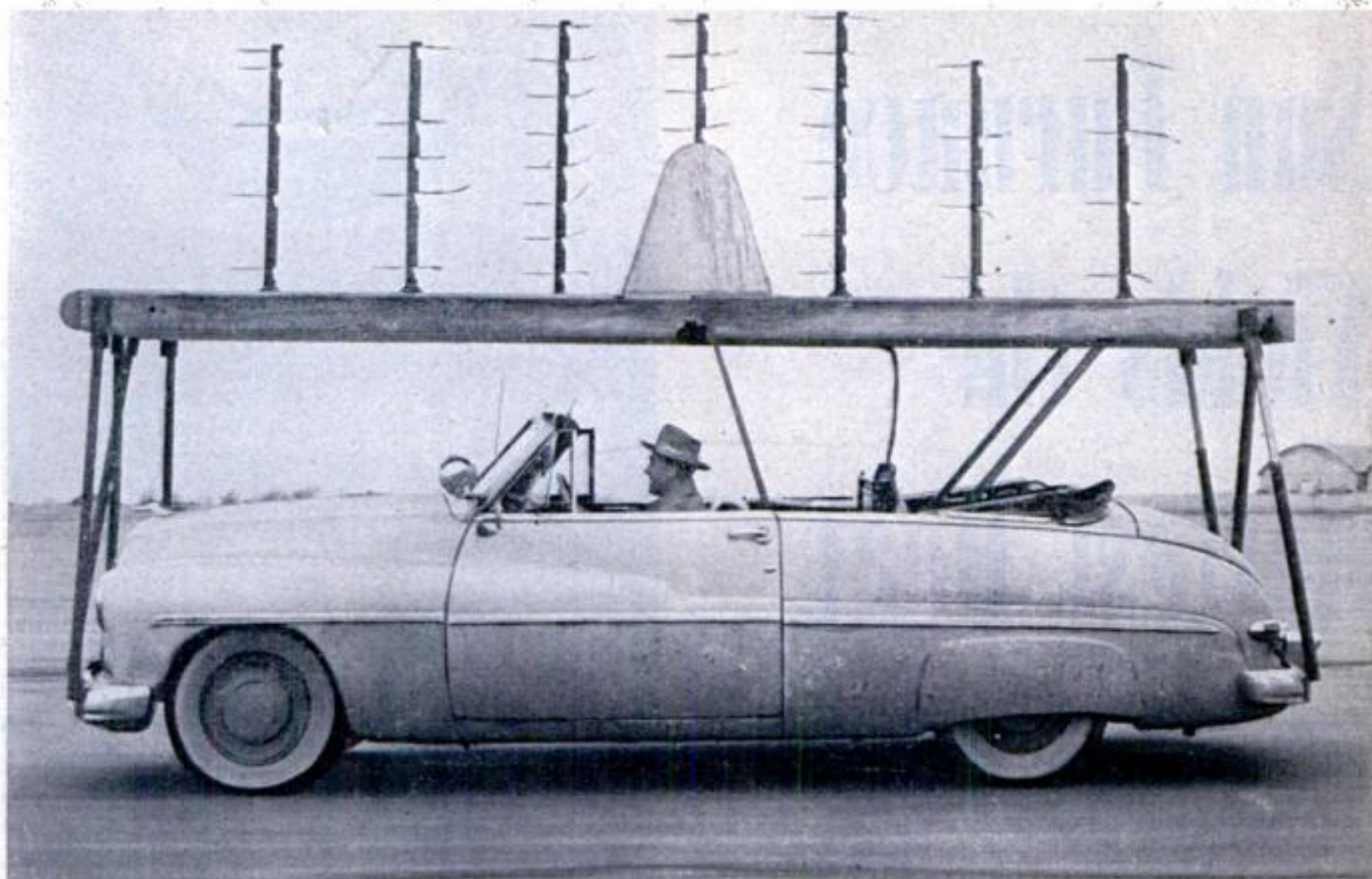
Will you join us?

END

Antique sports cars were scheduled to do a four-lap exhibition run, for which they are shown

in the starting lineup, but it developed into a real race by the time they hit the second lap.

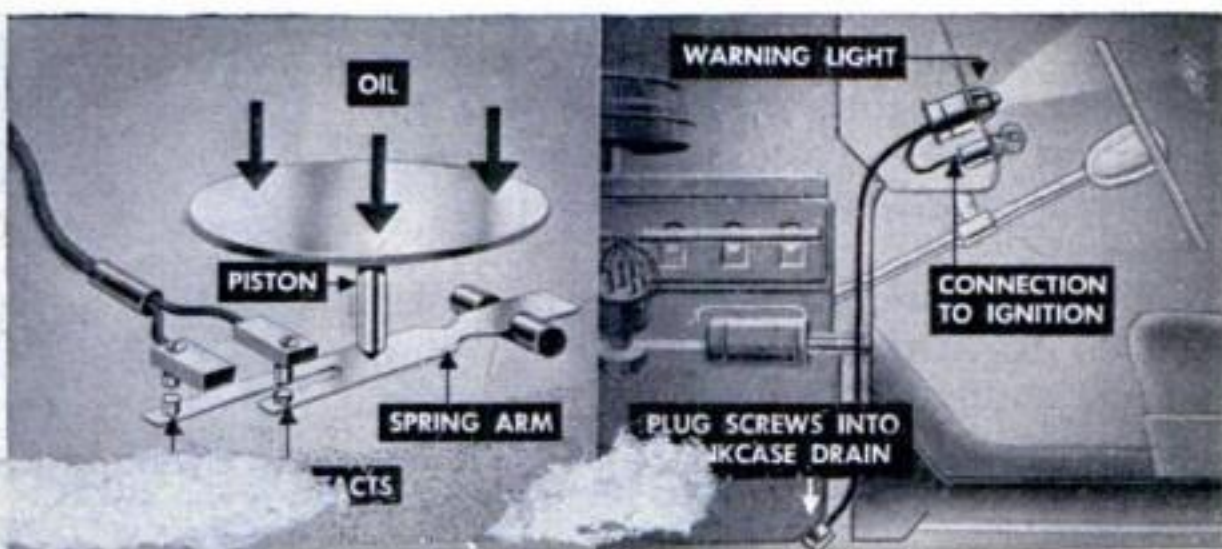




Car Solves Air Crash Mystery

THE strange-looking contraption on top of this car is helping aircraft engineers solve the mystery of mountaintop plane crashes. Air blowing over a mountain ridge expands as it flows down the lee side, causing a sharp drop in air pressure. This gives a plane's altimeter a higher reading, causing the pilot to think he has a lot more altitude than he actually has.

To get at the problem, the Beech Aircraft Corp., of Wichita, Kans., places baby mountains on top of the car-mounted platform and then makes runs at 60 m.p.h. to find out just how much the pressure drops. The vertical pipes hold tubes that record the air pressure at various points on both sides of the model. Results show that the two-foot "mountain peak" can cause an altimeter error of 125 feet—enough to allow an unsuspecting pilot to crash in bad weather.



Warning Light Spots Oil Drop

FORGETFUL motorists won't run out of oil with this new warning device. The Oil-Spy lights up when your oil level drops. A dash light is wired to a plug that replaces the drain plug in the crankcase (far right).

The oil, pushing down a piston inside the plug, holds a spring arm away from two electrical contacts (center). When oil level drops one quart, the decrease in weight lets the arm push up against one contact, lighting an amber bulb. When it drops two quarts, the second contact lights a red bulb.

Sun Furnace Yields the Hottest Heat

Experimenters with a giant "burning glass" seek new high-temperature data to benefit science and industry.

By Alden P. Armagnac

THE little French suburb of Meudon, a few minutes' drive from Paris, boasts what well may be the hottest place on earth.

Scientists have set up in the open there, at the Observatory of Meudon, a furnace that looks like a searchlight. It yields an estimated maximum temperature of about 9,000° F., which approaches that of the surface of the sun. Hotter by far than the hottest man-made flame, it melts or turns to vapor anything you can name.

Inspecting the Meudon furnace for the first time, an observer looks in vain for massive electric cables feeding it power. No raging fires heat it. To turn it on, its operators simply twirl handwheels that point it at the sun.

For this remarkable apparatus, a "solar furnace," is actually a gigantic burning glass. Scientifically engineered, it works none the less on exactly the principle of the toy-sized hand lenses that char wood and burn paper.

Seeking new data to benefit science and industry, a pioneering team of three researchers is exploring uncharted realms of high temperature with its aid. The group consists of the research director of the National Center of Scientific Research, Felix Trombe; and his two associates, Marc Foex

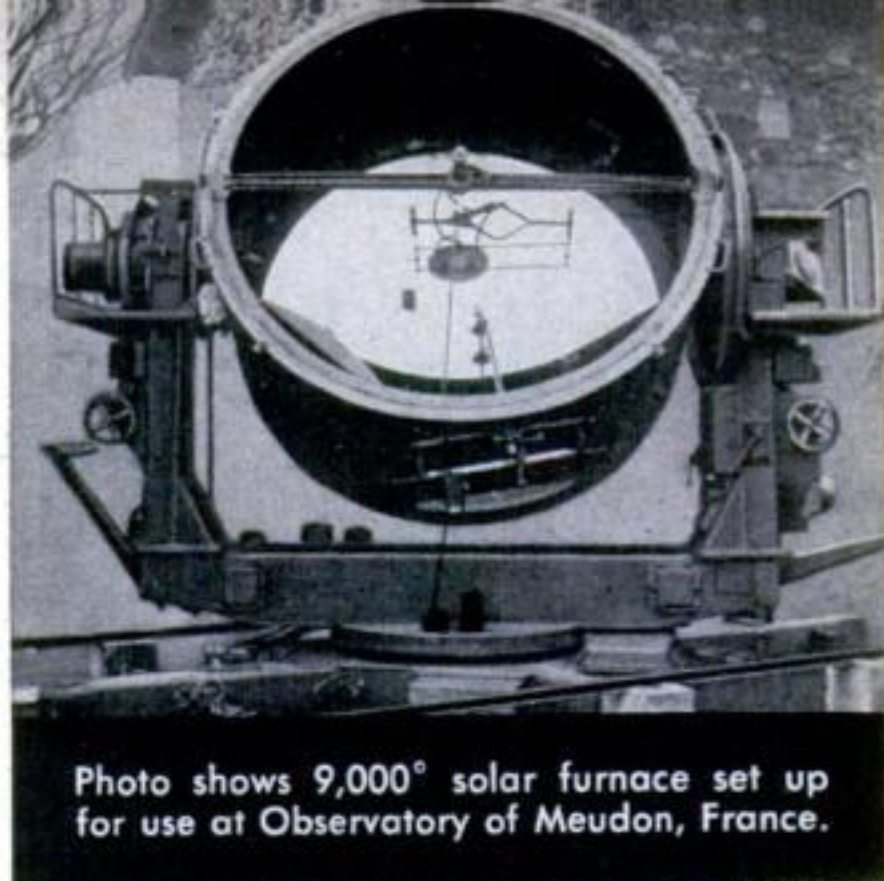
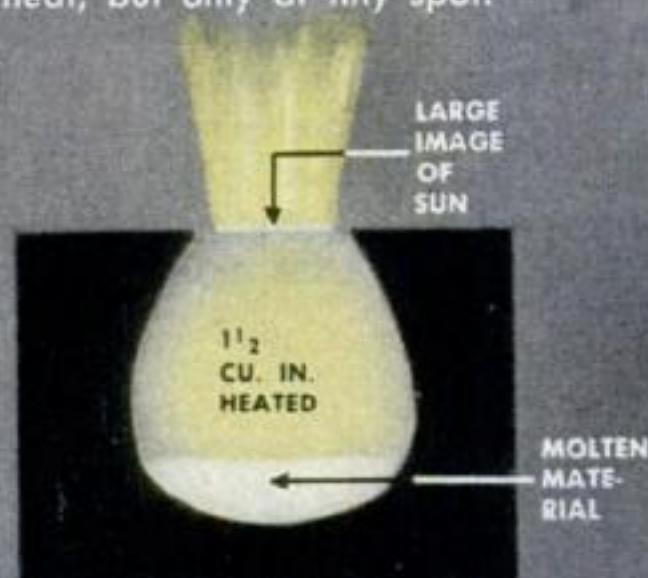


Photo shows 9,000° solar furnace set up for use at Observatory of Meudon, France.

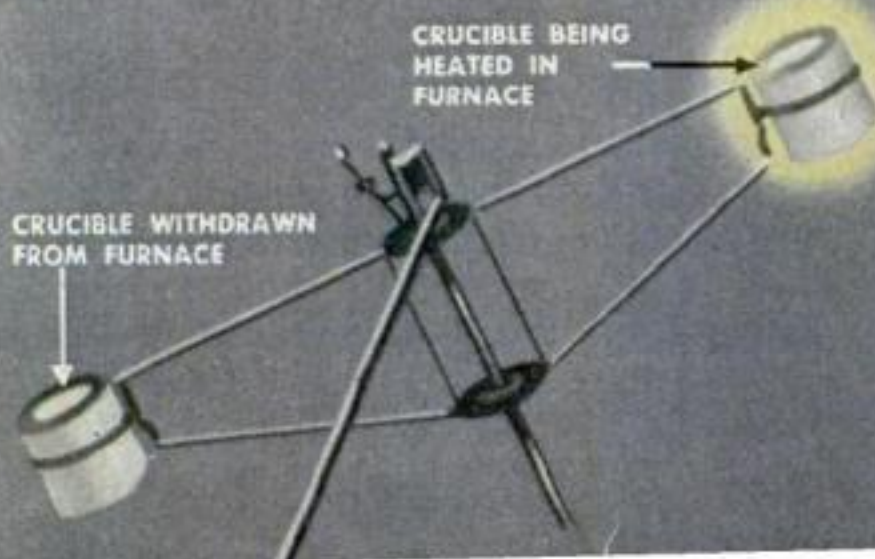
SMALL
SIZE
OF
SUN'S
IMAGE
LIMITS
HEATING
EFFECT

Familiar principle of burning glass is applied by sun furnace. Hand lens will give great heat, but only at tiny spot.



Sun furnace heats this sizable space by producing big "hot spot," and focusing it on cavity in material to be treated.

Remote-control holder substitutes one crucible for another to permit uninterrupted series of high-temperature tests.



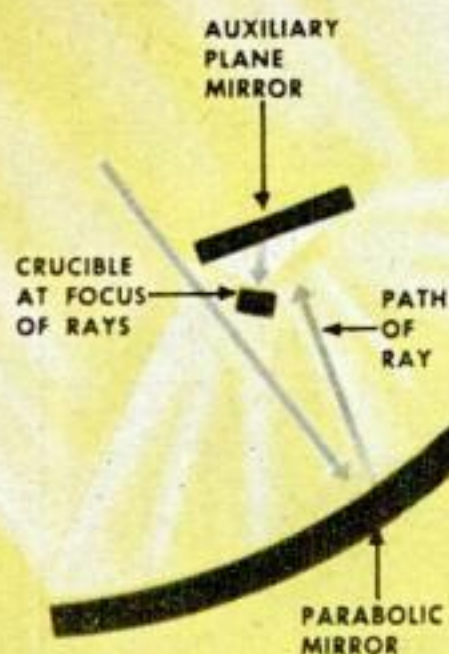
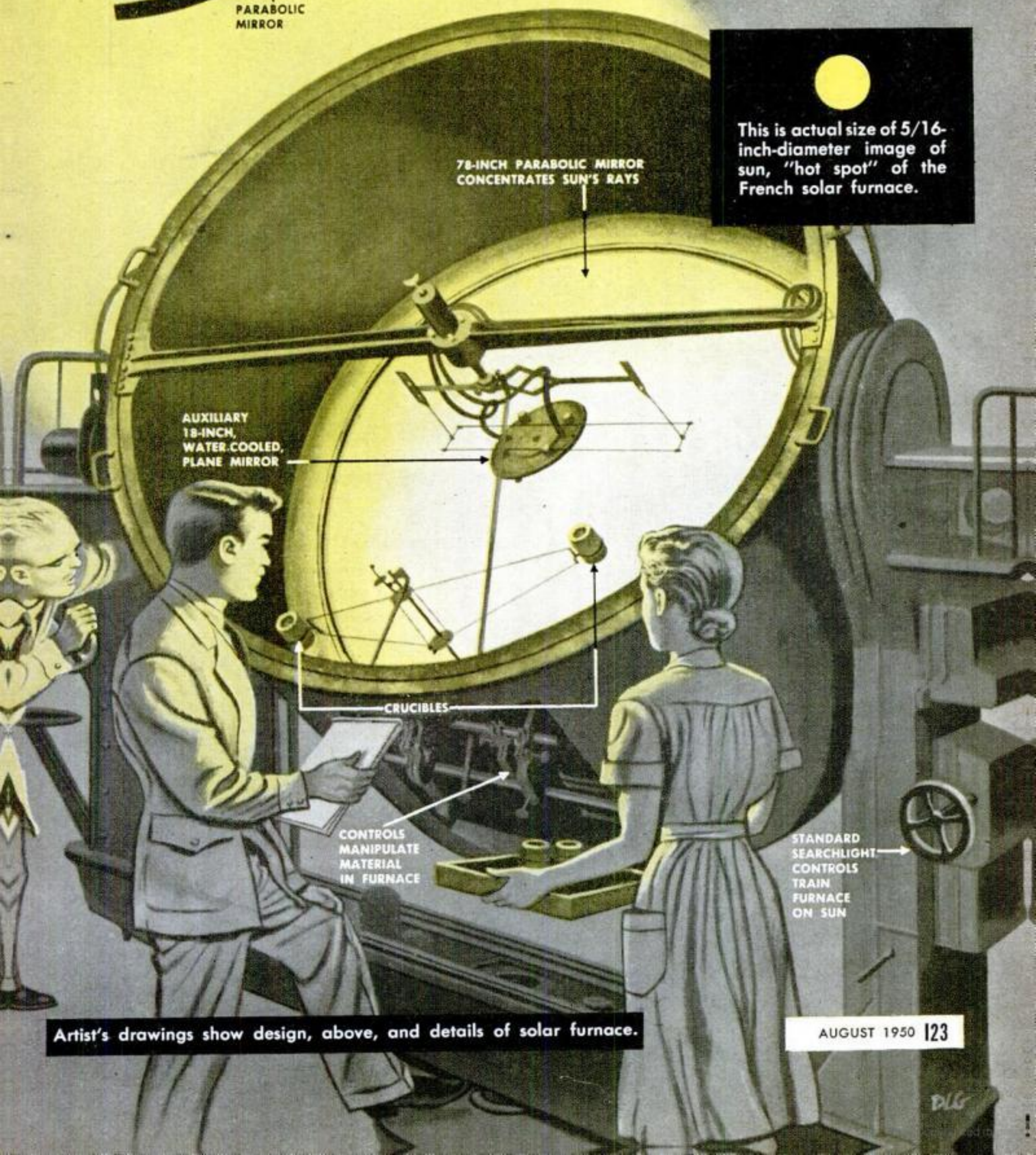


Diagram shows optics of sun furnace. Auxiliary plane mirror permits heating loose material in upright crucible.



Water cooling keeps heat from melting plane mirror, made of polished aluminum and mounted within five inches of rays' focus.



This is actual size of 5/16-inch-diameter image of sun, "hot spot" of the French solar furnace.

and Mlle. Charlotte Henry La Blanchetais.

Their furnace concentrates the sun's rays with an ex-German antiaircraft searchlight mirror of 6½-foot diameter, fashioned precisely to parabolic shape by the famed opticians of Jena. Its searchlight housing trains it on the sun. Aim is correct when a tiny solar image formed by a sighting telescope is centered on a target screen.

The big mirror has a focal length of 50 inches, and it acts like a burning glass on a block of material mounted just that far in front of it. A modified arrangement heats loose material more conveniently. A flat 18-inch auxiliary mirror of highly polished aluminum intercepts the converging rays, just before they come to a focus, and turns them downward upon material in an upright crucible. The area most intensely heated is confined to a fraction of a square inch, and a crucible of heat-resisting quartz withstands the surrounding temperature.

Superhot source of the furnace's heat is a 5/16-inch-diameter image of the sun formed at the focus. In theory, such an image might match the 10,700° F. surface temperature of the sun itself. Actually, the air and each mirror absorb some solar rays, and the small mirror, when used, slightly shadows the big one. Even so, the sun furnace yields a calculated maximum temperature of 9,080° F. with one mirror and 8,900° F. with two. Both arrangements have been used in experiments.

When the furnace's "hot spot" strikes a substance, extraordinary things happen.

In 10 seconds, a one-ounce chunk of iron liquefies, and partly vaporizes.

Only 30 seconds' time is needed to melt alumina, whose fusion point of more than 3,700° F. exceeds that of firebrick.

Volcanic lava is ice water compared to

A Journey into

Here is how
they
are obtained

BUNSEN
BURNER
WILL HEAT
CONTENTS
OF SMALL
CRUCIBLE
TO:



ABOUT
1,800°

BELOW RED HEAT

Here is
what
happens

0°

1,000°

2,000°

RED HEAT

WATER
BOILS:
212°

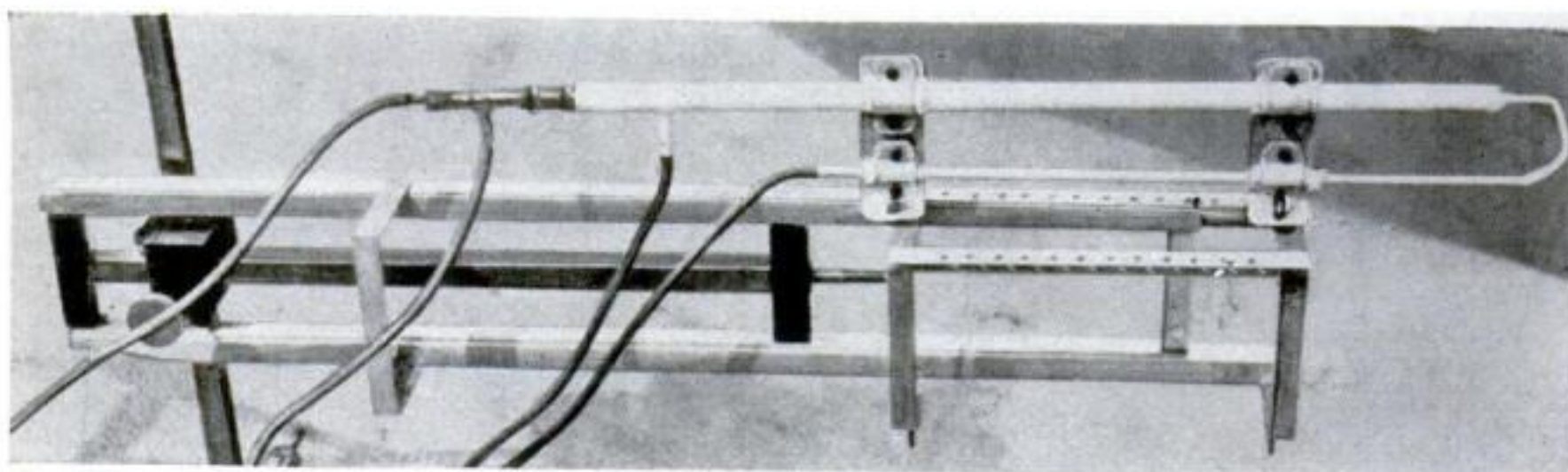
LEAD
MELTS:
621°

MER-
CURY
BOILS:
674°

LAVA FLOWS
FROM VOL-
CANOES AT:
ABOUT 2,000°
(AVERAGE)

Temperature of sun furnace surpasses that of hottest flame, produced by newly developed

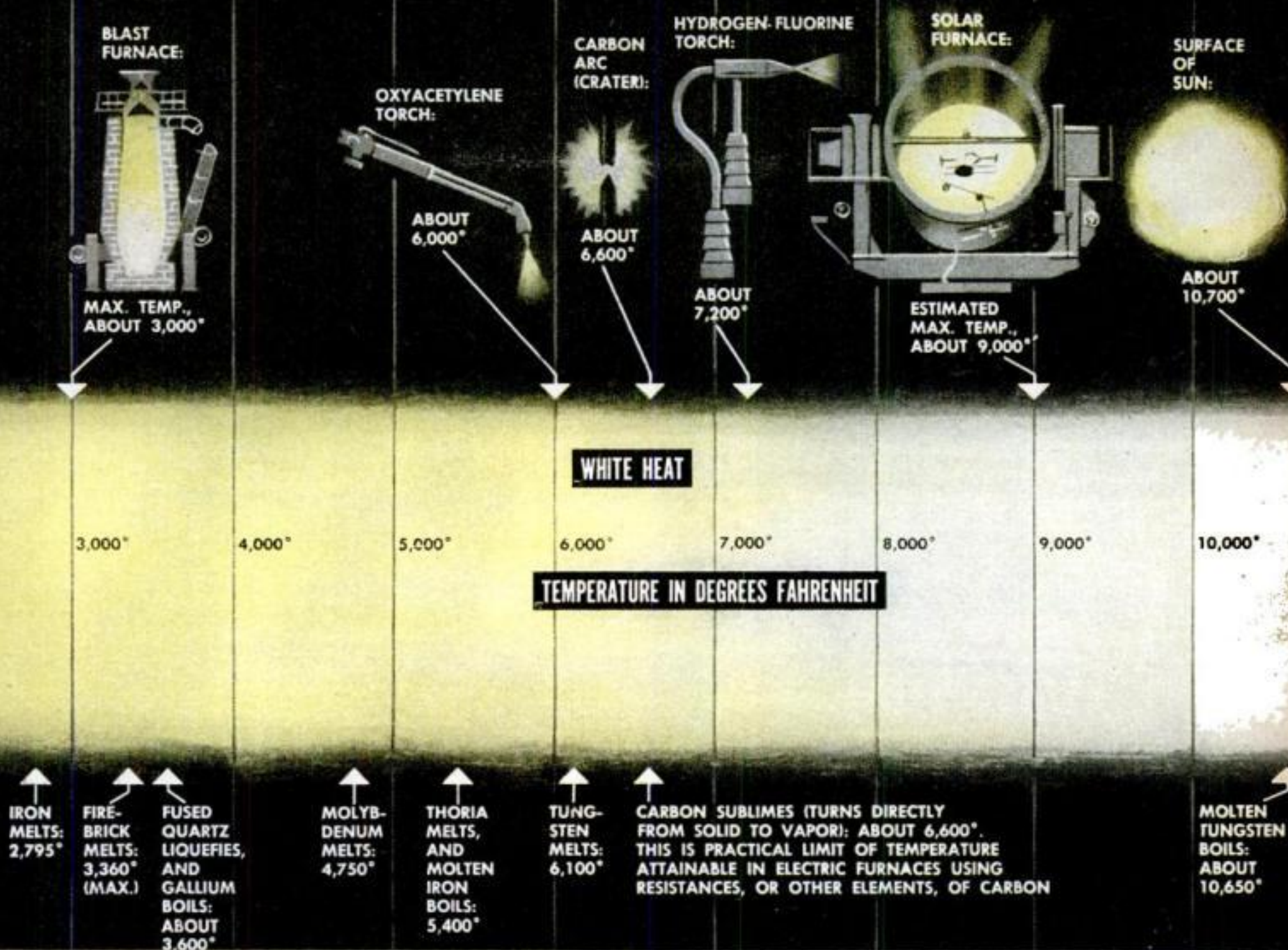
molten thoria. It takes 5,400° F. to fuse this opaque white oxide of thorium, one of the most refractory substances known. Melting it with ease, the sun-furnace experimenters obtain solid, fused thoria in the novel form of a transparent pinkish-colored "glass."



Sun furnace captures air's nitrogen with quartz tube above. Right-hand end of thick section is heated. When experimenters feed a gentle stream of air through tube, they obtain nitric

oxide, raw material for fertilizer. Novel process might rival present commercial ones. Connections to tube, left to right, are cooling-water inlet and outlet, air outlet and inlet.

the Realm of High Temperature



hydrogen-fluorine torch. Data below scale of pictorial chart show how heated materials be-

have. All become red-hot and white-hot at temperatures indicated, regardless of composition.

Heated even hotter, to 6,600° F., graphite turns directly to vapor in the solar furnace.

An era of jet engines, rockets, and atomic power highlights the usefulness of the new sun furnace for testing refractory materials. Ceramic glazes of alumina and magnesia, bonded to metal, are among the most promising of materials being perfected to enable turbine blades and combustion chambers to stand higher and higher temperatures. Beryllia crucibles were used to melt uranium for the atom bomb. More recently, atomic workers are using crucibles of a remarkable new refractory, cerium sulphide, which has a metallic gold color and can withstand 4,000° F. in a vacuum melting furnace. Now sun-furnace experiments may lead to other improved materials.

Crucibles holding up to 1½ ounces of material for test in the sun furnace are placed at its focus in a revolving holder. To produce larger fused specimens, the ex-

perimenters continuously feed powdered material from a hopper to a crucible at the "hot spot" through a quartz tube in which a rotating nickel-chrome fitting acts as a miniature screw conveyor. Meanwhile the crucible is slowly lowered, and a solid piece of fused material is built up—much as synthetic rubies and sapphires are "grown" by sifting powdered material through a flame that fuses it.

Ingots up to nearly three inches in length of fused zirconia, beryllia, and alumina, substances whose melting points range up to more than 4,850° F., have been produced in the sun furnace. Its operators have adapted it to turn these materials into tubing, crucibles, and other useful laboratory ware, by rotating the heat-treating crucible like a potter's wheel.

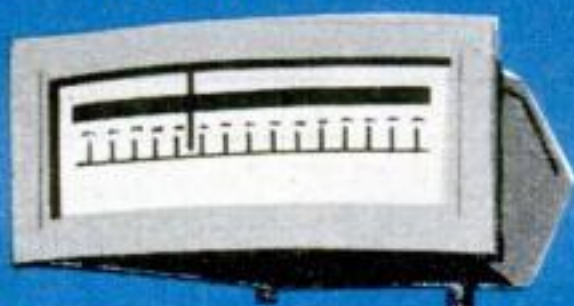
High-temperature chemical reactions can be carried out in the sun furnace. One of these suggests a novel way to capture the

How High Temperatures Are Measured

Mercury thermometer cannot read high temperatures because mercury boils at 674° F.



Gallium thermometer reads to more than 2,000° F. by using liquid gallium metal (which boils at about 3,600° F.) in a heat-resistant quartz tube.



Electric thermometers of resistance and radiation-pyrometer types indicate temperatures beyond range of liquid-column thermometers.



Optical pyrometer gauges brightness of incandescent object on which it is sighted, to measure highest temperatures indirectly.



Seger or pyrometric cones of different refractory materials whose melting points are known indicate high temperatures by melting in turn as these points are reached.

air's nitrogen for manufacturing fertilizer.

The experimenters focus the sun's rays on a quartz tube, containing loose granules of thoria to hold a high heat. A gentle stream of air passes through the tube, absorbing enough of the heat to keep the quartz and thoria from melting. Just as in big electric-arc furnaces, the air's nitrogen and oxygen combine to form nitric oxide—raw material for nitric acid and, in turn, nitrate fertilizer. A water-cooled section of the tube abruptly chills the product, to keep it from decomposing in slow cooling, and it is recovered by leading the air containing it through a chemical solution. The yield in percentage compares not at all badly with that of the fabulously power-consuming arc process—and the solar energy is there for the taking!

Record Highs in Temperature

Far greater temperatures than the sun furnace's can be obtained momentarily. Though estimates vary widely, all credit the atom bomb's explosion with a heat of millions of degrees—undoubtedly the highest temperature attained by man. Previously the record was about 36,000° F., obtained when Mt. Wilson Observatory experimenters exploded small wires with electric currents of as much as 60,000 volts and 45,000 amperes from a bank of condensers.

Temperatures sustained long enough to treat materials and study their behavior have been much more modest. A former record of 6,600° F. for furnaces was set by deliberately heating an electric induction furnace containing a graphite crucible until it was wrecked—to see how hot it could get. Although higher temperatures have been measured at some points in electric arcs, this is the limiting figure at which graphite elements of furnaces vaporize.

Hottest of flames is that of the hydrogen-fluorine torch, a recent and novel U. S. invention. It attains 7,200° F. Copper, which conducts heat away so fast that an ordinary torch makes little impression on it, can be welded or cut with the new one. Uniquely, it produces *combustion without oxygen*. Concentric copper tubes supply fluorine gas through a central orifice, and hydrogen gas through an annular one, at the nozzle. The hydrogen chemically combines with the fluorine, just as it does with oxygen, producing heat and flame.

The sun furnace, which opens the way to still higher temperatures, is no new implement. Giant burning glasses were popular



World's Biggest Color Photo

VISITORS to New York City's Grand Central Terminal are now greeted by this giant color transparency, the largest of its kind ever made. Sixty feet long and 18 feet high, the illuminated transparency is part of a new photographic exhibit and information center recently set up on the station's east balcony by the Eastman Kodak Co.

Made at the Kodak plant at Rochester, N. Y., the giant Colorama, as it is called, was enlarged approximately 44 diameters from the original negatives.

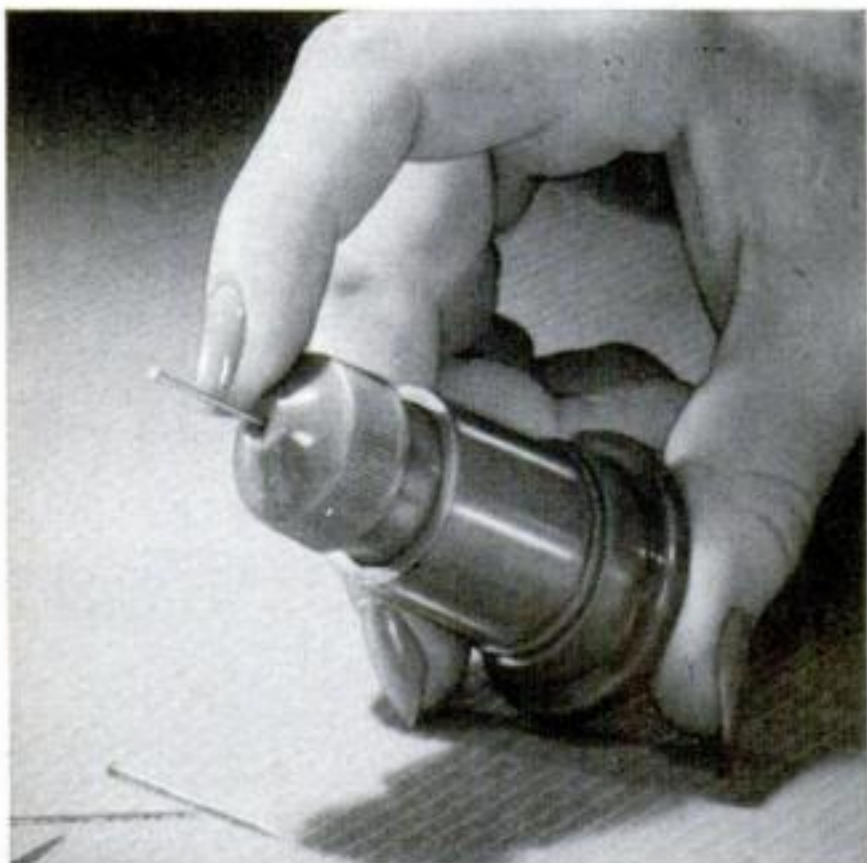
It was made by slicing 5- by 9½-inch negatives into small strips ½ inch wide and 5 inches long, and then enlarging these, one at a time, on special positive color film. The enlarged strips, each 19½ inches wide and 18 feet long, were then carefully trimmed, matched, and spliced together to form the completed picture. Finally, this was wound

on a 20-foot-long spool and shipped by rail to New York City. At Grand Central Terminal, special tracks were laid to permit a small flatcar carrying the spool to roll right out onto the balcony.

Suspended in a giant steel frame, the transparency is illuminated from behind by more than a mile of tubular cold-cathode lamps spaced 2½ inches apart, the largest such lighting installation ever built. Across the back is a plastic sheet frosted like photographic ground glass to diffuse the light and insure even illumination. Across the face is a similar sheet that is nearly transparent except for a slight diffusive effect that prevents reflections and glare from lights.

The display will remain in Grand Central indefinitely, with the picture changed every few weeks. At times the entire expanse will be given over to a single scene. **END**

Aids to Modern Living



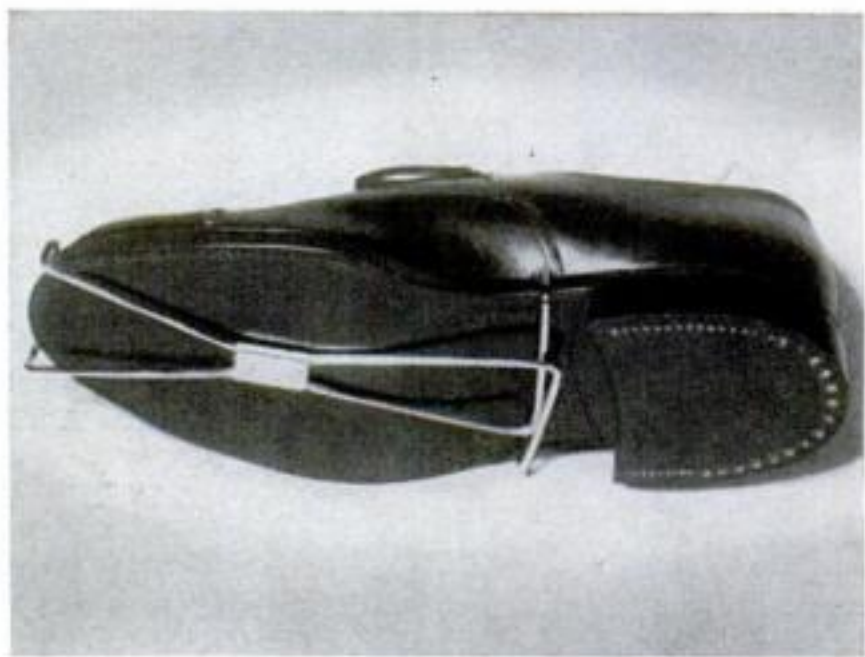
CONTAINER DISPENSES PINS. This plastic gadget stores straight pins and also hides them from small children. A press-down action, as shown above, pops out a single pin, head first, through an opening in the removable cap. Novo-Plas Manufacturing Co., Inc., of New York City, prices the dispenser at about 30 cents.



TWO HEADS ARE BETTER THAN ONE. This sprinkling can has interchangeable heads: one for regular spraying and a smaller one for applying weed killer or watering potted plants. The head not being used is screwed to a threaded base at the top of the can. Geuder, Paeschke & Frey Co., of Milwaukee, Wis., makes Tri-Way.



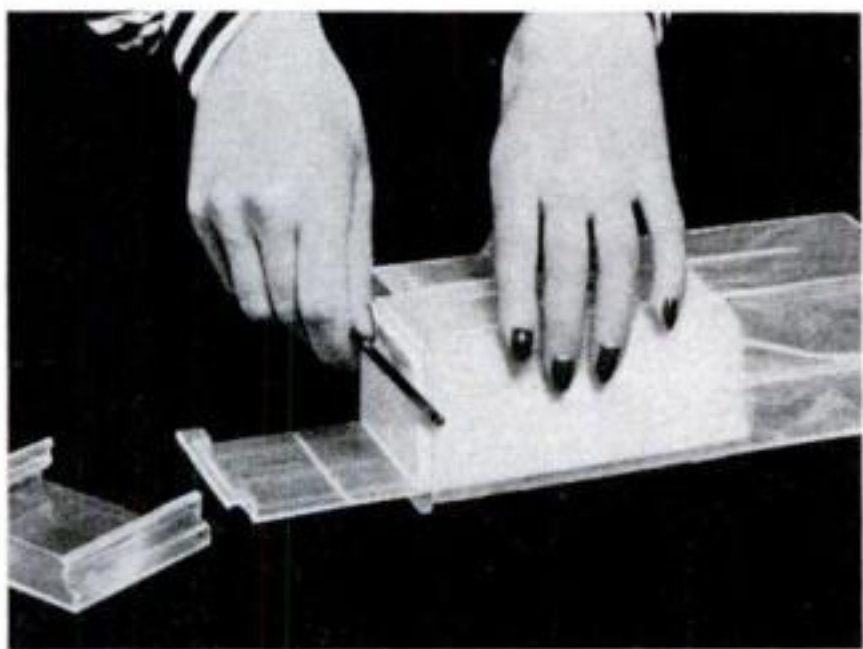
CABINET IS REFRIGERATOR. The grained wood exterior of this combination refrigerator and cupboard, shown in inset above, makes it suitable for use in a living room or office. Measuring 33 by 36 by 20 inches, the snack bar has a stainproof Formica top, and stores beverages, glasses, food, and 56 ice cubes. A $\frac{1}{2}$ -hp. compressor operates on AC. L. B. Herbst Corp., of Chicago, distributes the bar.



TREE CLAMPS TO OUTSIDE OF SHOE. To prevent your shoe from curling, just place the curved end of this new all-metal shoe tree over the toe, squeeze open its clamp, and place over the shoe's sole edges, as shown. Made by Fortner and Perrin, of Glendale, Calif., the trees fit any size shoe. Three pairs sell for \$1.25.



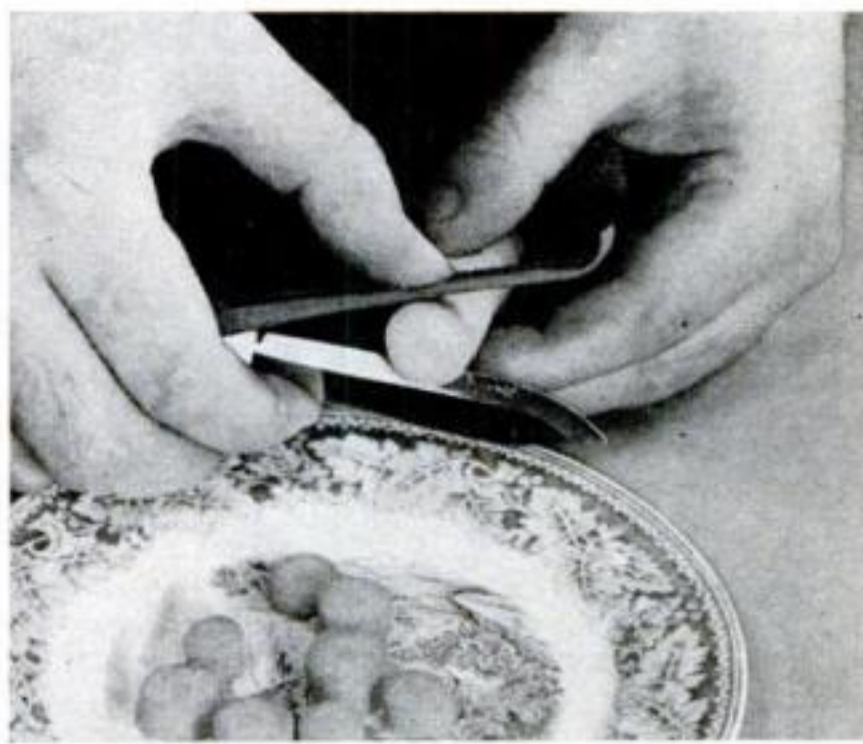
SWIVEL HOLDS SPOON LEVEL. The stainless-steel bowl of this training spoon has a swiveling device that keeps it level between plate and mouth. The slight pressure exerted in scooping up food, however, holds the bowl firmly in one position. And by adjusting a locking device on the detachable handle, the spoon becomes a conventional one (inset). It is available from Price Industries, of Akron, Ohio, for \$1.25.



CUTTING BOX KEEPS CHEESE FRESH. A two-pound cheese package stored in this container pulls out on a sliding tray for easy slicing. The cutter, when not in use, slips into a slot in the end cover. Made of polystyrene, Chee-Slicette can be washed in scalding water. The Kenneth E. Luger Co., of Minneapolis, sells it for \$1.



YARN STAYS AT HAND. Balls of knitting yarn or crocheting thread suspended from this Tenite plastic bracelet dangle but won't tangle—or roll under furniture. A removable button on the bottom of the shaft piercing the ball keeps it from falling off. The Knit Bit Holder is sold by the Gerard Co., of Winnetka, Ill., for \$1.



KNIFE HAS THUMB PROTECTOR. A plastic guard on this knife lessens the hazard of cutting your thumb. To slice a vegetable, hold it between the protector and the knife blade, as above. To use the knife in the ordinary way, fold the protector back against the handle. It is priced at 50 cents by Miles Kimball Co., of Oshkosh, Wis.



• **1 TIN CAN BEGINS** at plating mill where steel strip is given thin coating of tin as it passes

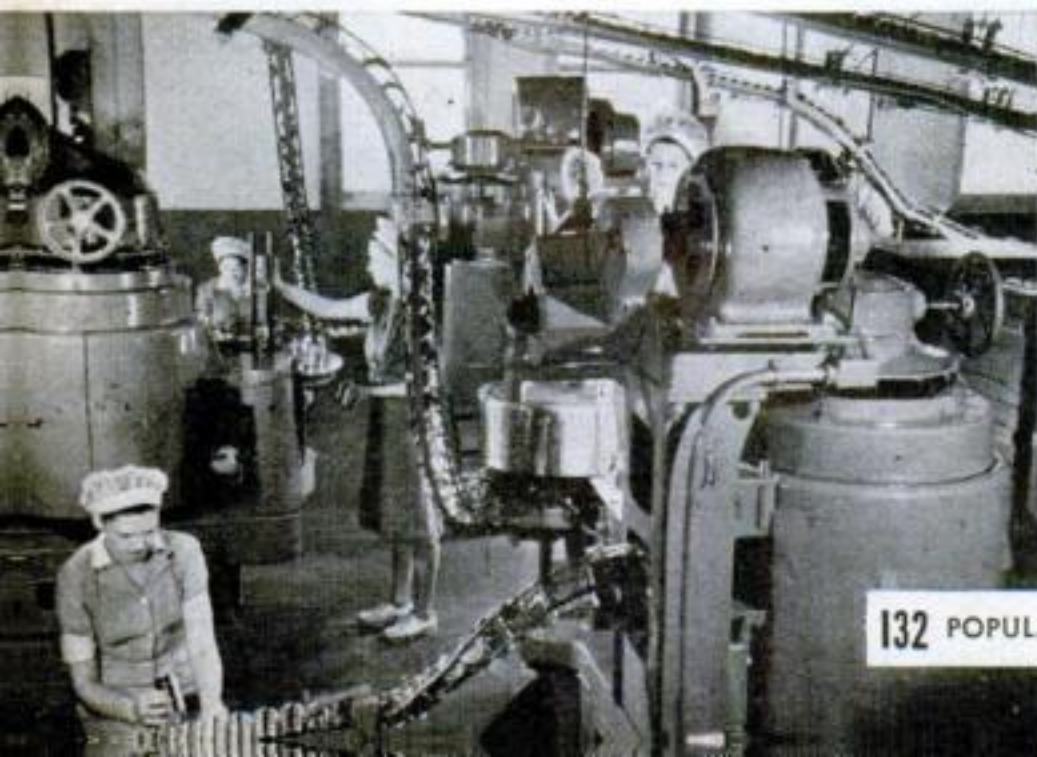
through electrolytic bath. Ninety-pound bar of pure "pig" tin above serves as anode, source of the tin.

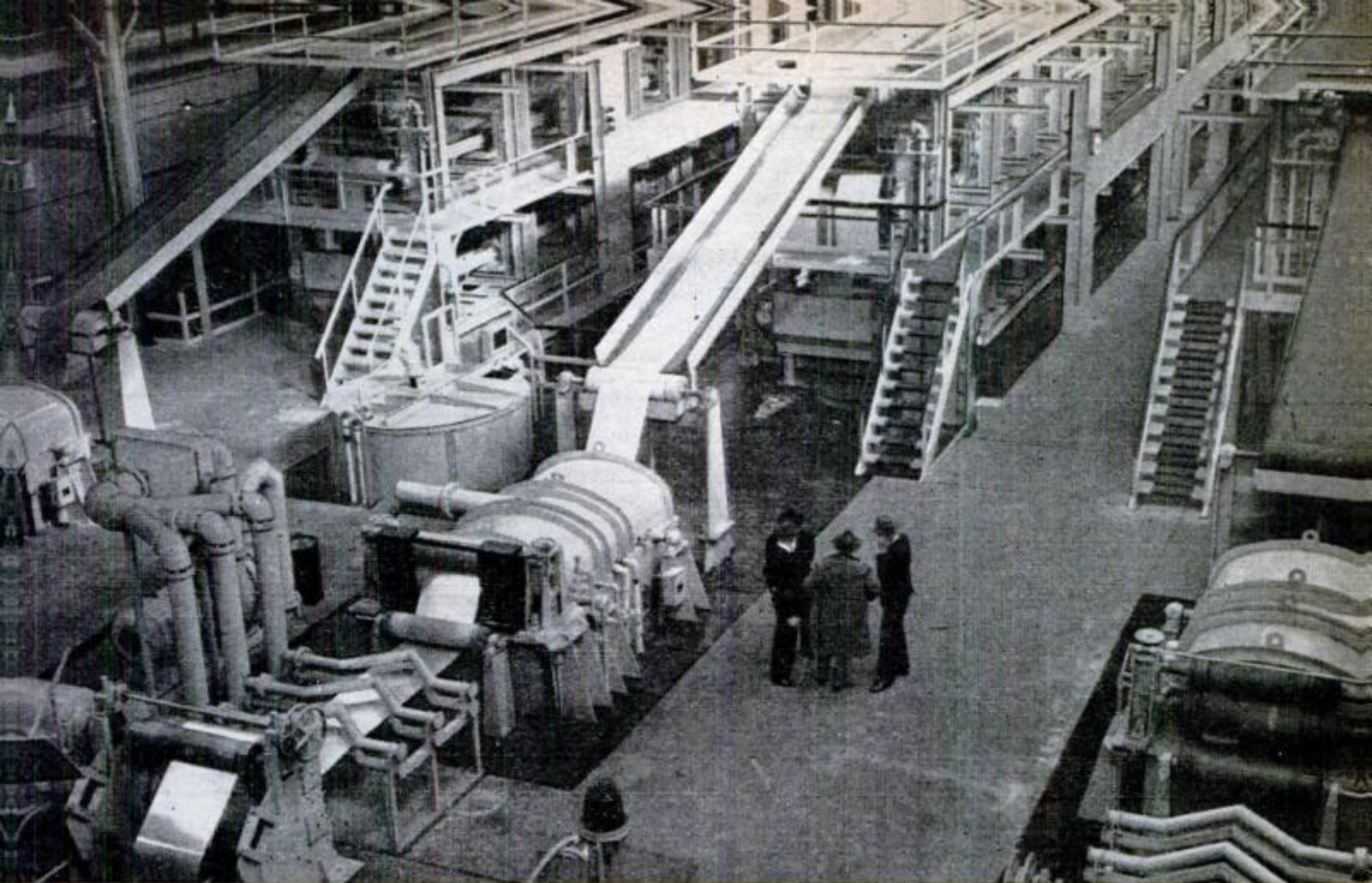
53 Million Tin Cans Every Day

BEHIND the cans you use—53 million every day—are scores of complicated machines and miles of clattering conveyers. The body steel is first plated with tin to keep it from rusting. Then it is punched, pounded, bent, and squeezed into the shape of a can. Finally it is cleaned, filled, capped, and labeled. Yet if all the machines were joined in a single assembly line, it would take only minutes to turn a bare sheet of steel into a finished can of your favorite soup. That's how fast they work—and that's why over 40,000 products, in the food industry alone, can be packed into about 20 billion cans every year.

5 ENDLESS STREAM of can bodies moves into capping press that seals on bottoms with liquid rubber for airtight bond. Plant is American Can Co.

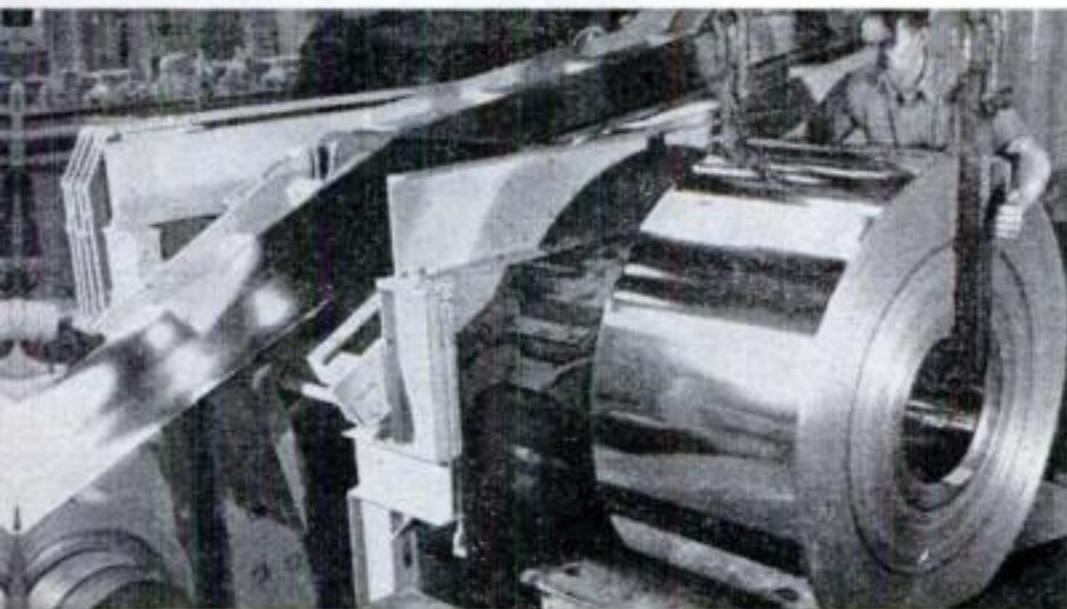
6 AT FOOD PACKERS, lidless cans are sterilized, then filled by machines, like this one at Heinz plant, that dispense right amount into each can.



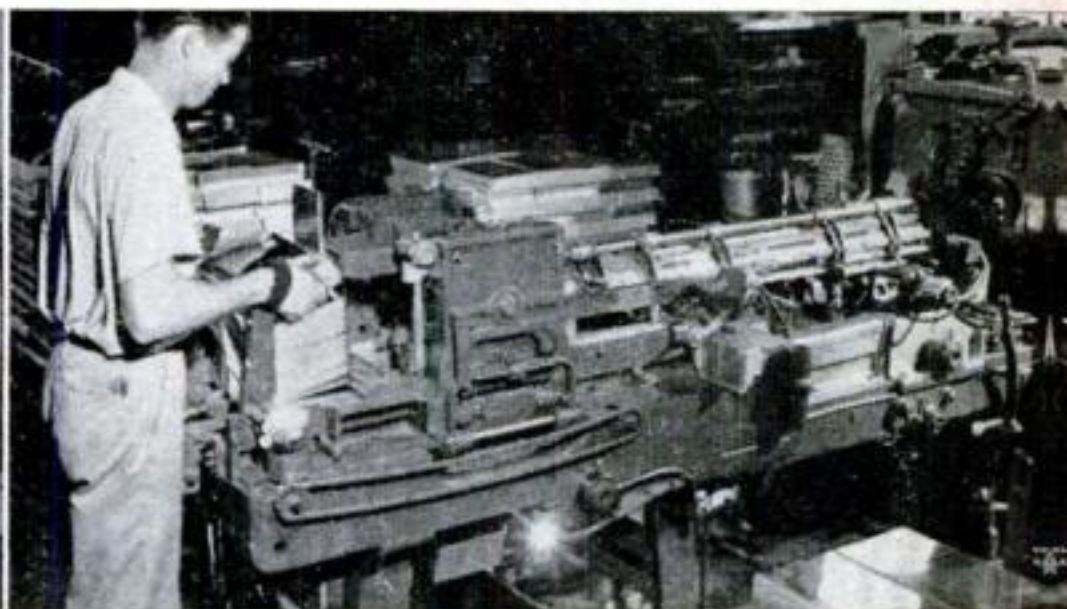


2 ELECTROPLATING METHOD, born of wartime need to save tin, vastly speeds process. This 400-

foot installation at Weirton Steel Co. turns out tin-plated strip at rate of 2,240 feet a minute.



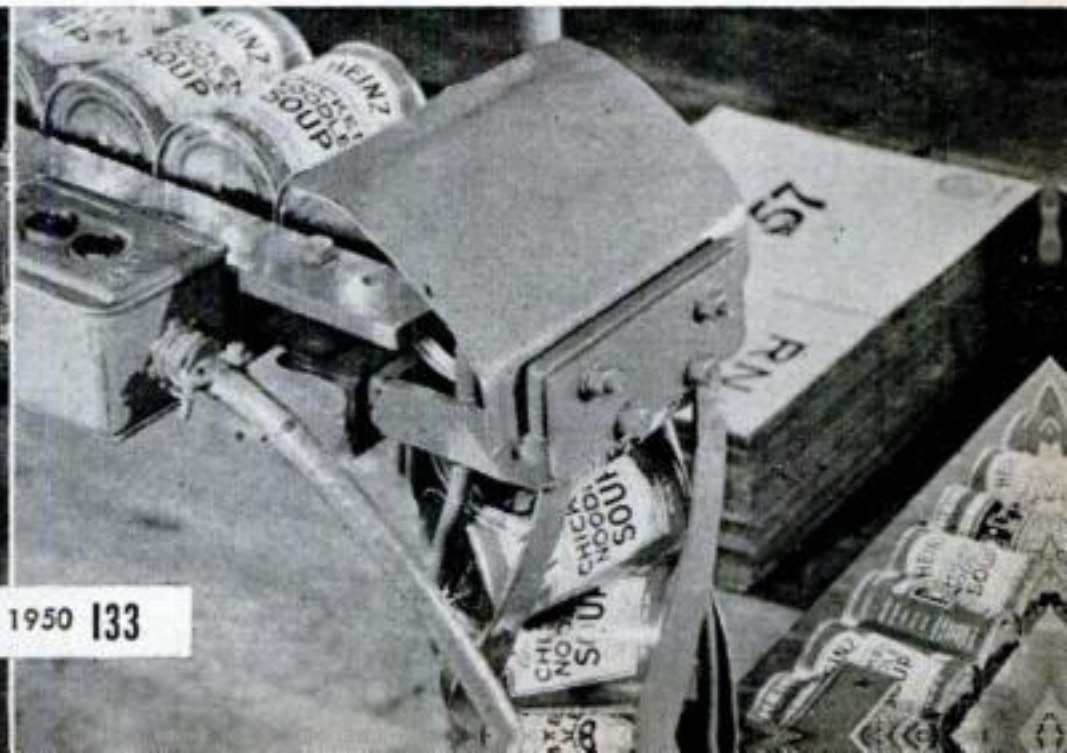
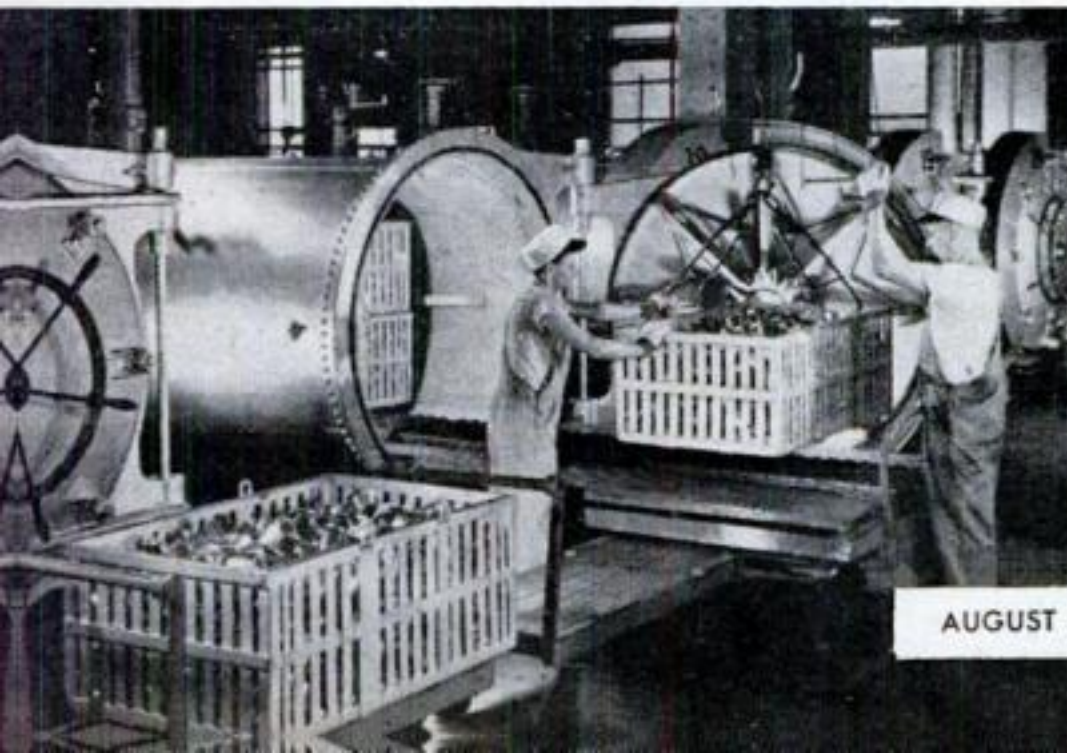
3 AT END OF LINE, strip is coiled into 25,000-lb. rolls. High-frequency current remelts rough electrolytic deposit, makes it smooth and shiny.



4 AT CAN FACTORY, tin strip is cut into small sheets. Machine above then bends them around cylinder to form can bodies and solders seams.

7 AFTER CAPPING under heat that produces vacuum to keep food fresh, cans are again sterilized in these giant retorts holding 9,600 cans apiece.

8 IN FINAL STEP, cans ride conveyer through automatic labeling machine, then come out here, ready for packing and shipment to grocers' shelves.



Test section cut from finished road shows 5½-inch depth.



Plastic Road Rolled Out on the Run

By George H. Waltz, Jr.

YOU'D have to lope like a marathoner to keep up with the builders of this new type of road. And it not only goes down at eight m.p.h. but it can support heavy traffic within a few hours.

The Navy recently demonstrated the ingenious road-building technique on the sandy beach at Port Hueneme, Calif. A single run over a section of the beach with a train of road-building equipment pulled by a tractor converted it into a road that was hard enough to be used by a jeep in two hours. Within three hours it was able to support a 7½-ton truck. After 48 hours a loaded truck that tipped the scales at 14 tons rolled back and forth over it without leaving a tire mark.

The Navy's new road-building process, the result of research by Dr. Hans Winterkorn of Princeton University, has important civilian possibilities. It requires no special equipment. For the most part, conventional road-building machinery can be used. The secret consists simply of wetting the sand or soil with aniline, furfural resin, and a catalyst, mixing the sand and the chemicals thoroughly, and settling and compacting the mixture with a vibrating metal sled.

During the rapid chemical reaction that follows, the resinous mixture that surrounds each grain of sand or particle of dirt hardens like cement—only very much faster. The result: a durable road surface, 5½ to 6 inches deep. In a sense, it is a road made from plastic that sets at normal outdoor temperatures.

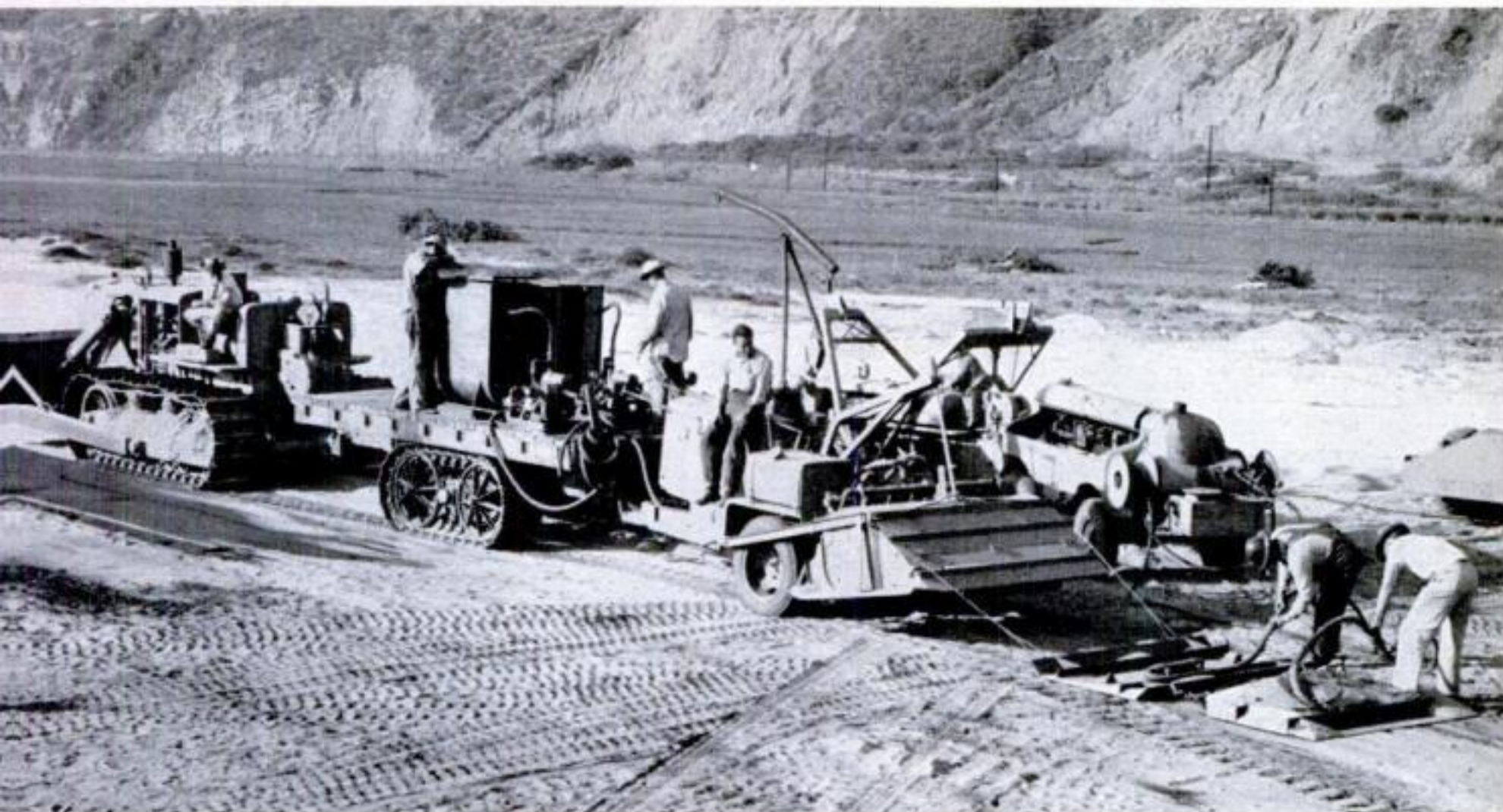
For military landing strips and beach-head roads, building speed is more important than cost. Civilian roads, however, can be built more leisurely and economically. The amount of chemicals used can be cut down and an inexpensive waterproofing

material—asphalt, tar, or oil—added to fill out the mixture. It's estimated that a civilian road could be built by such methods at about a tenth the cost of present-day concrete roads.

Dr. Winterkorn is experimenting with a similar chemical method for producing "plasticrete"—a concretelike building material in which resinous materials replace conventional cement. It would be valuable in foundations for buildings and bridge piers

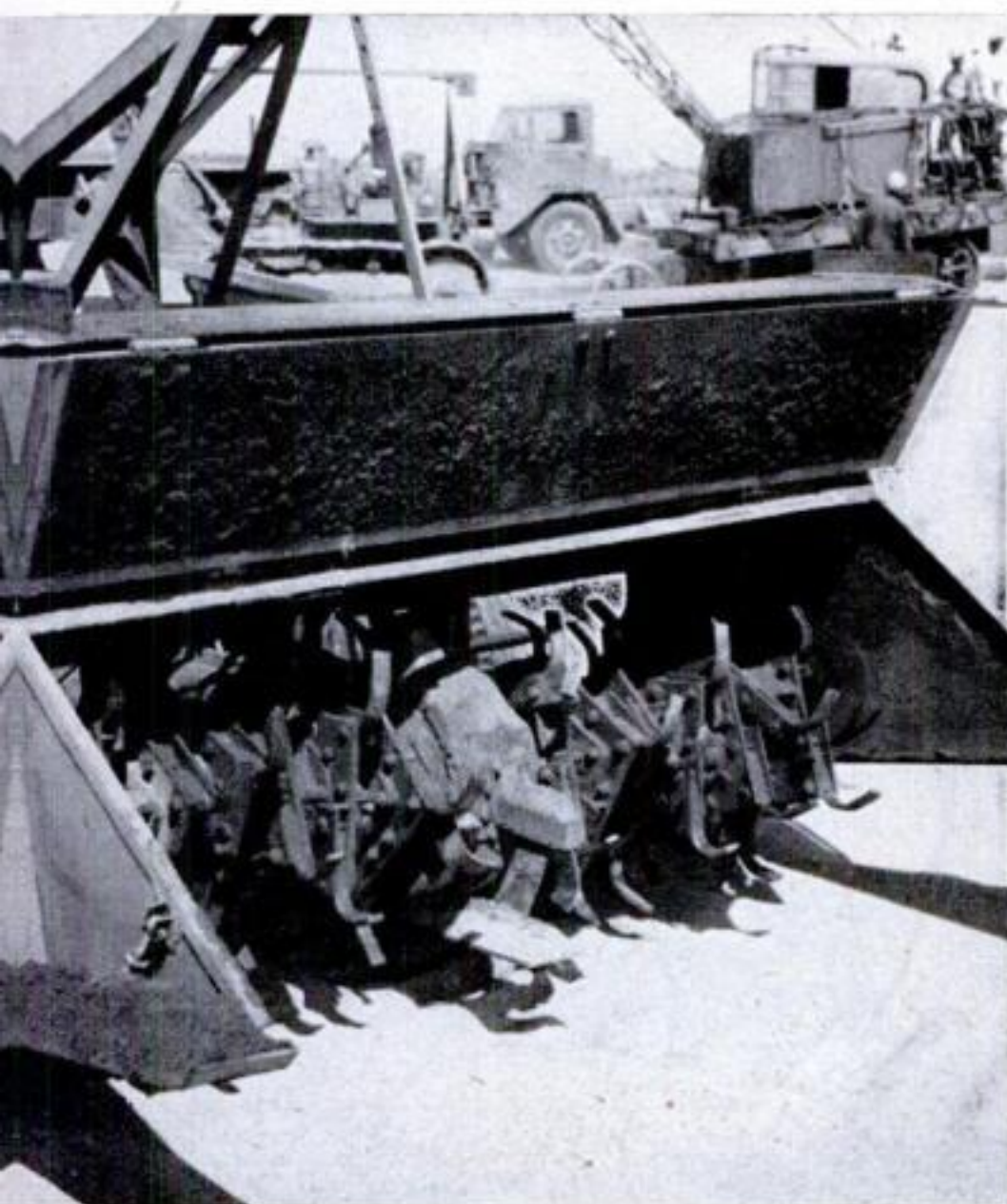


Chemicals are sprayed on the sand or dirt ahead of the mixing machine or soil stabilizer. The chemicals—aniline, furfural resin, and a catalyst—are stored in a large tank mounted on a platform fitted with treads and are fed to the sprayer head under pressure.



Equipment pulled by tractor can lay the plastic road on a beach at a rate of about 8 m.p.h. Same system with slight modification can be

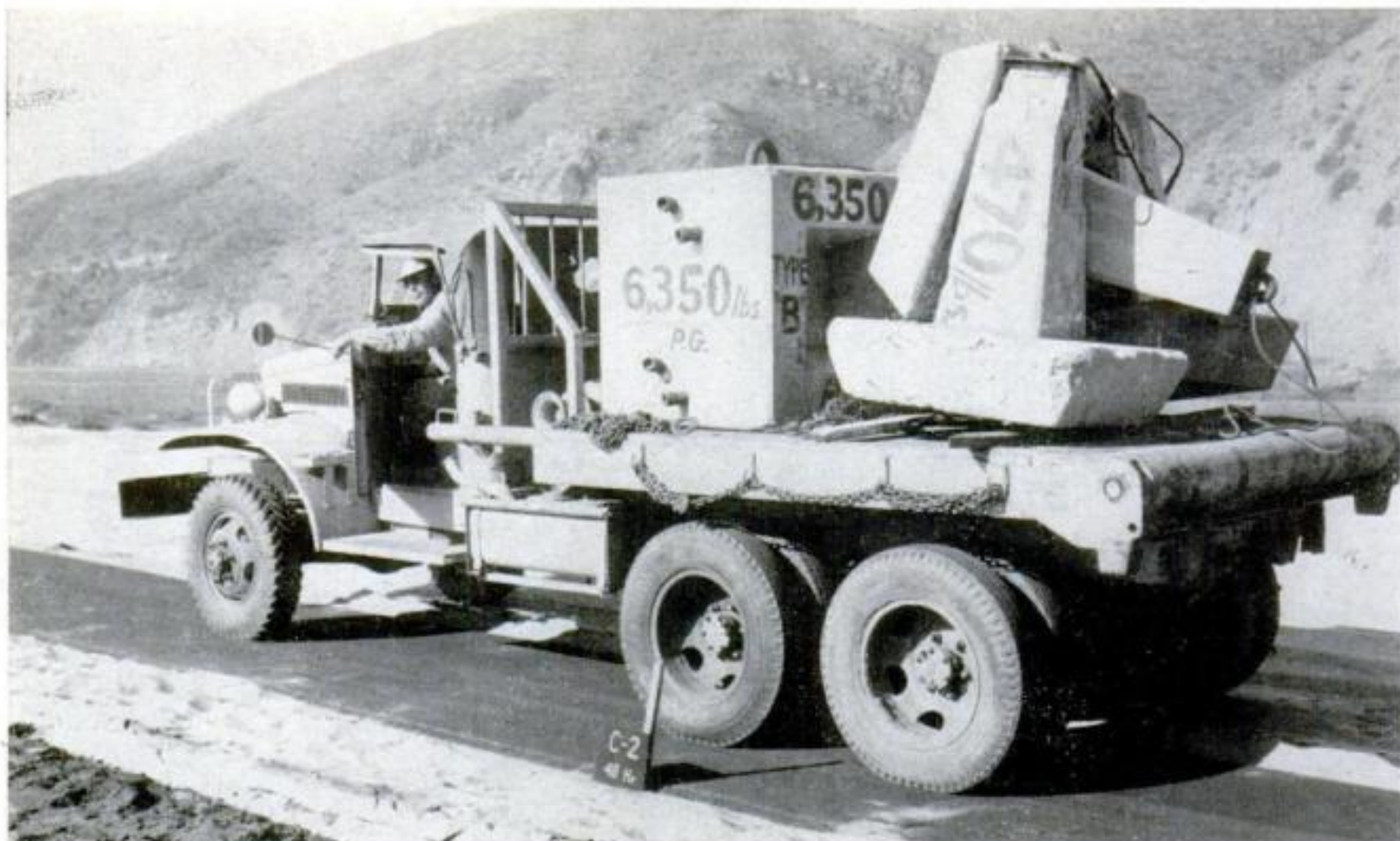
used for building roads on a dirt base. Careful analysis of soil or sand must be made to determine chemical mixture to be employed.



Soil stabilizing machine consists of a series of rotating arms that blend the chemicals into the sand or dirt to form a uniform mixture. Width of the road section is limited only by the size of the soil stabilizer, which is a conventional piece of road-building equipment.



After the chemicals have been sprayed on and mixed with the sand or dirt, the mixture is settled and compacted by a vibrating metal sled, shown above. Air hammers operated by a portable compressor, seen at right in the photo at top of the page, vibrate the sled.



Forty-eight hours after test road was completed on the beach at Port Hueneme, Calif.,

in localities where the chemical make-up of the soils and natural waters causes ordinary concrete to deteriorate.

Both the new plastic roads and plasticrete are developments in a 19-year-old field of experimentation known as "soil stabilization." The oiled road of our rural districts is the simplest form of stabilized road. Its life, however, is short because the oil, which forms the binder or stabilizer, is at-

truck and load weighing about 14 tons rolled over it repeatedly without affecting the surface.

tacked by soil bacteria. The use of the aniline-furfural mixture, however, not only forms a sturdier road much faster, but is in itself a bactericide.

With newer and more roads becoming a critical national need, soil stabilization with plastics offers an inexpensive and quick answer. In the meantime, it is an ace in the hole if our armed forces ever have to roll down a road that isn't there. **END**

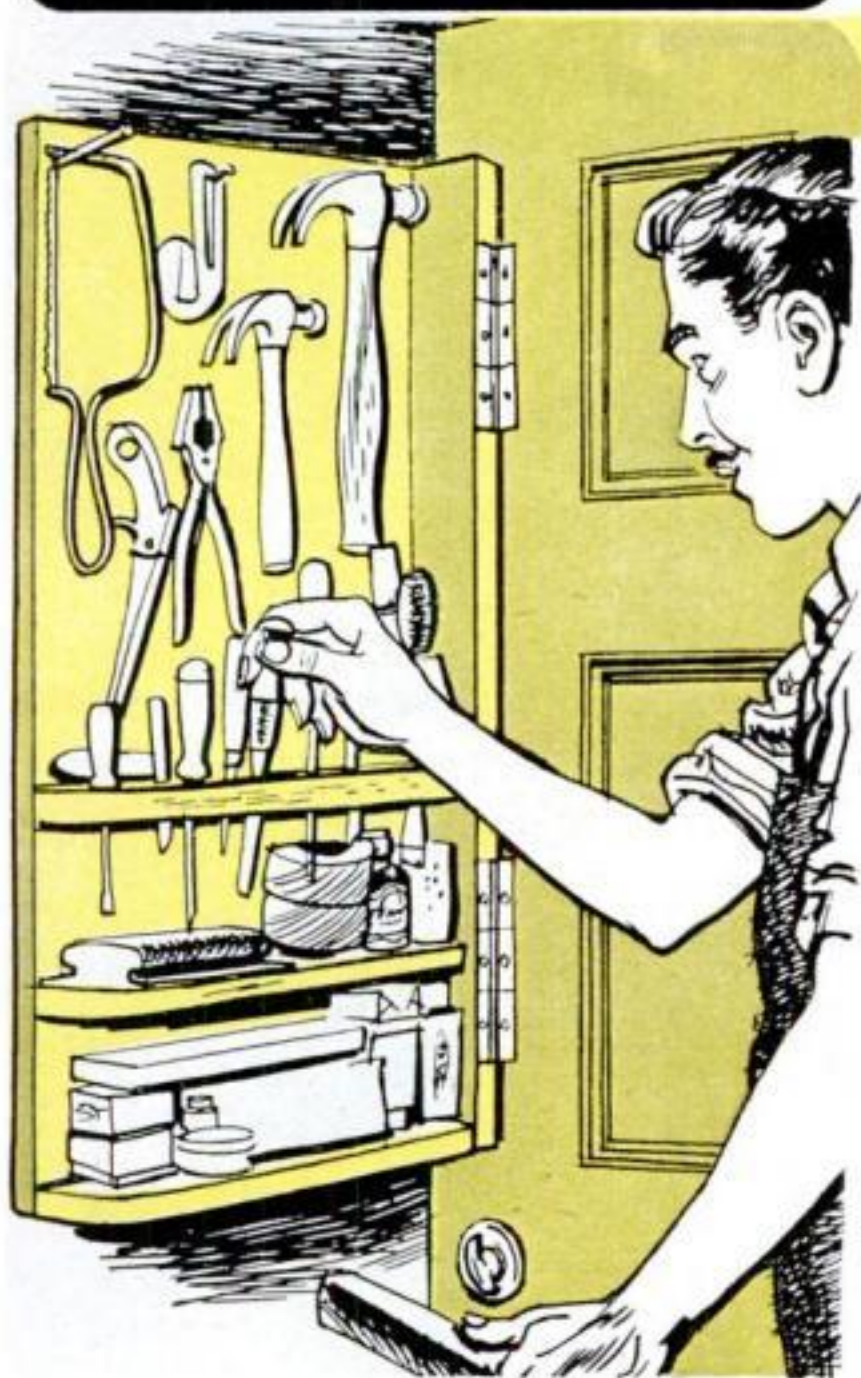
Dimwit Computer Shows How Big Brains Work



SIMPLE SIMON is the world's smallest and stupidest mechanical brain. It can't even add two and two—three is the highest number it knows. Simon is unable to solve any practical problem. Anything it can do, you could do faster. But Simon is useful for teaching how the big electronic brains work, since it employs their parts and methods for similar computations. It can add, find negatives, select numbers, and pick out the larger of two numbers.

Built at a cost of \$540, the demonstration brain reads problems from a paper tape or push-buttons, calculates with a suitcase full of relays, and flashes answers on tiny lights. Edmund C. Berkeley, computer expert (pushing switch in picture at left), designed it. Two Columbia University graduate students, Andrew Vall (center) and Robert A. Jensen (right), finished the construction job.

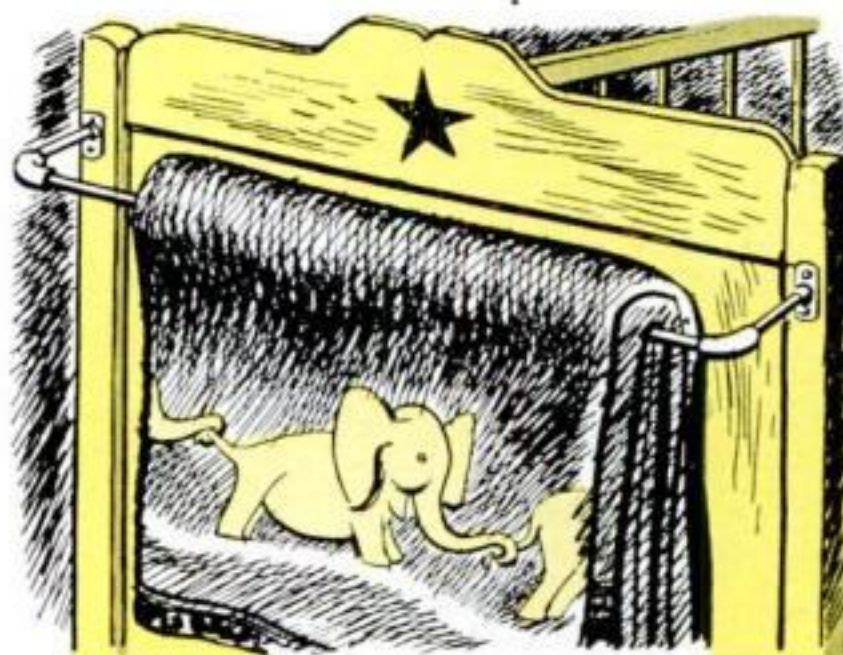
Keeping the Home Shipshape



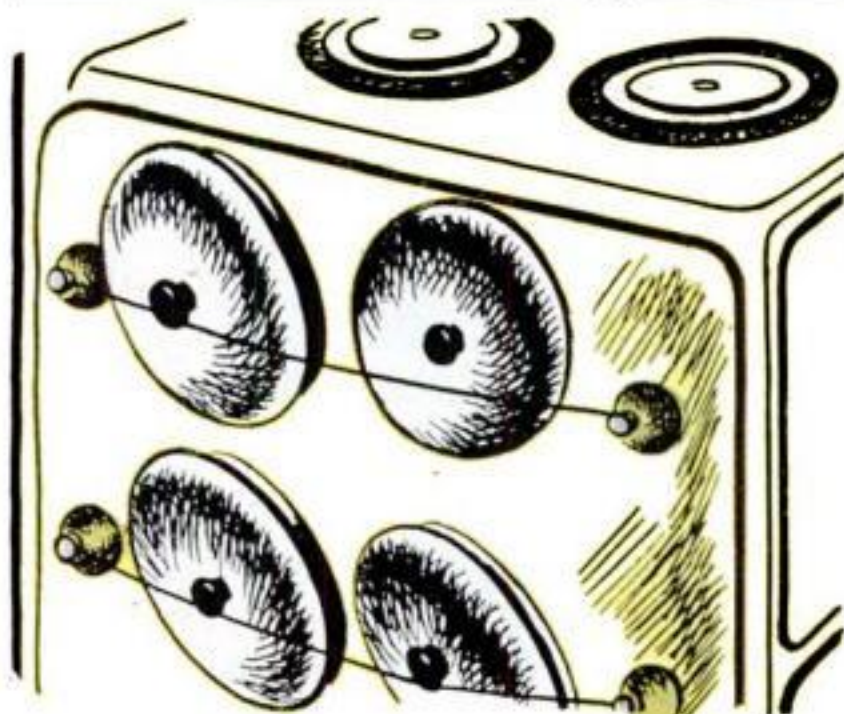
One way to use the waste space on the back of a closet door is to fill it with a rack for tools. If some of the tools tend to roll off, a lip on the shelf will stop them.



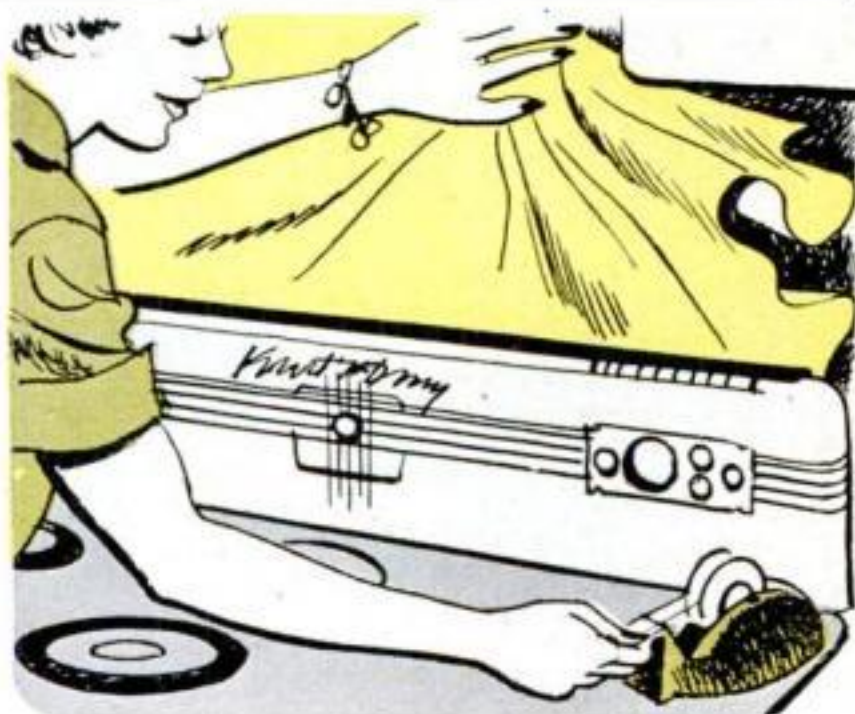
Wedges screwed to the bottom of a drawer keep a small child from opening it. A child tends to pull down on a drawer. An adult can lift the drawer so the wedge clears the spacer.



A pair of drapery brackets and a rod—screwed to the end of a baby's crib—make an excellent rack for hanging blankets and other bedding while you make up the bed.



Racks for pot lids can be made with suction cups and wire. Use cups with a minimum diameter of 2" and moisten them with glycerin before sticking them on a smooth surface.



Tape a strip of plastic sheeting to the wall area behind the kitchen stove. It's easily cleaned with a damp cloth. Be sure you don't use a plastic that burns readily.

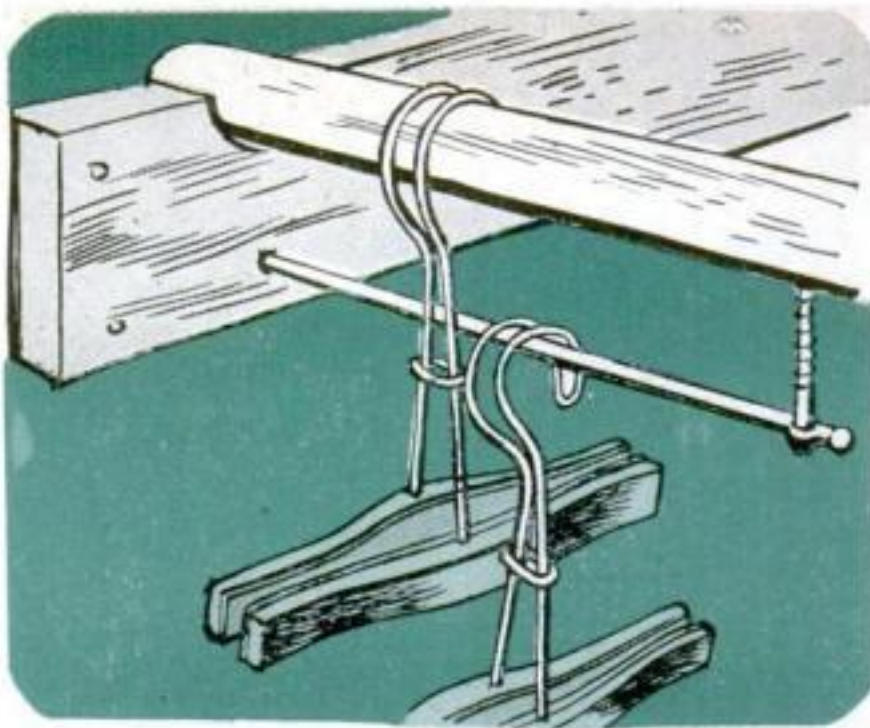
Please turn the page for five more suggestions.

AUGUST 1950 137

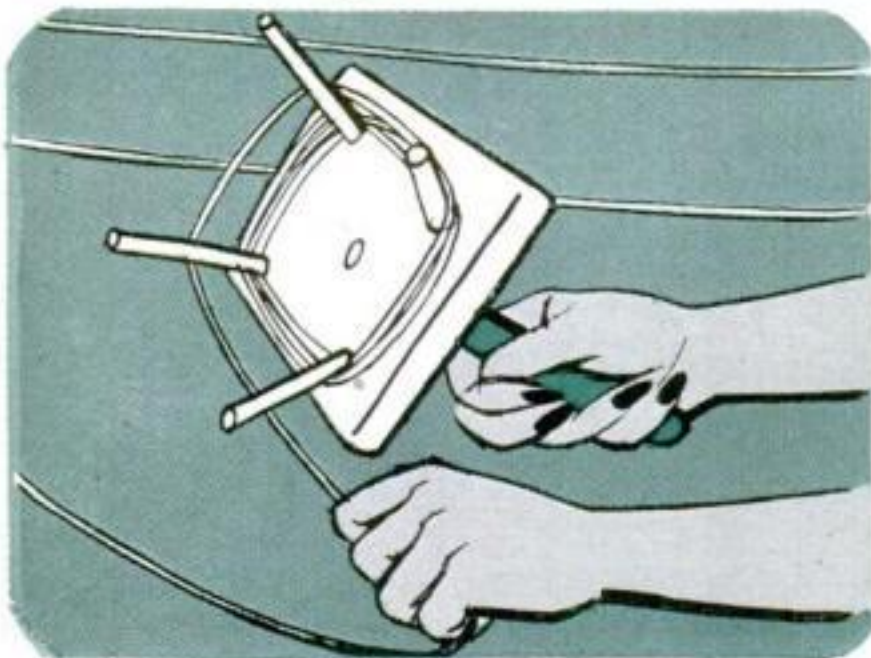
Keeping the Home Shipshape



If you need heavy thread—and none is on hand—use two spools of finer thread. Slip a length of drinking straw over the spindle to hold both spools, and thread the machine.



With a length of curtain rod attached to a clothes pole, your closet will accommodate about one-third more trouser hangers by alternating them on the upper and lower rods.



You can wind 100 feet of clothesline on this reel without kinking the rope. It's a 1" by 6" by 10" piece of pine with dowels in each corner. The handle is a section of broomstick.



A handy dispenser for oils or soap solutions can be made by cutting off the bottom of a used whipped-cream container. Punch holes near the end and support the can by wires.



You can make a temporary bed tray from a corrugated carton. Fold the flaps inside and

staple them. Cut out each side, as shown, and cover the top with a piece of cloth.



Plastic Covers Save Seats

WET swim suits, pets, or children can't harm auto upholstery protected by this loose-fitting, plastic seat cover, originally made to safeguard seats during repair work. The vinyl material resists most damaging substances, and wipes clean with a damp cloth. The Cover-All, marketed by Charles Burgoon & Co., Akron, Ohio, sells for \$3.95.

Air Columns Support Big Tent

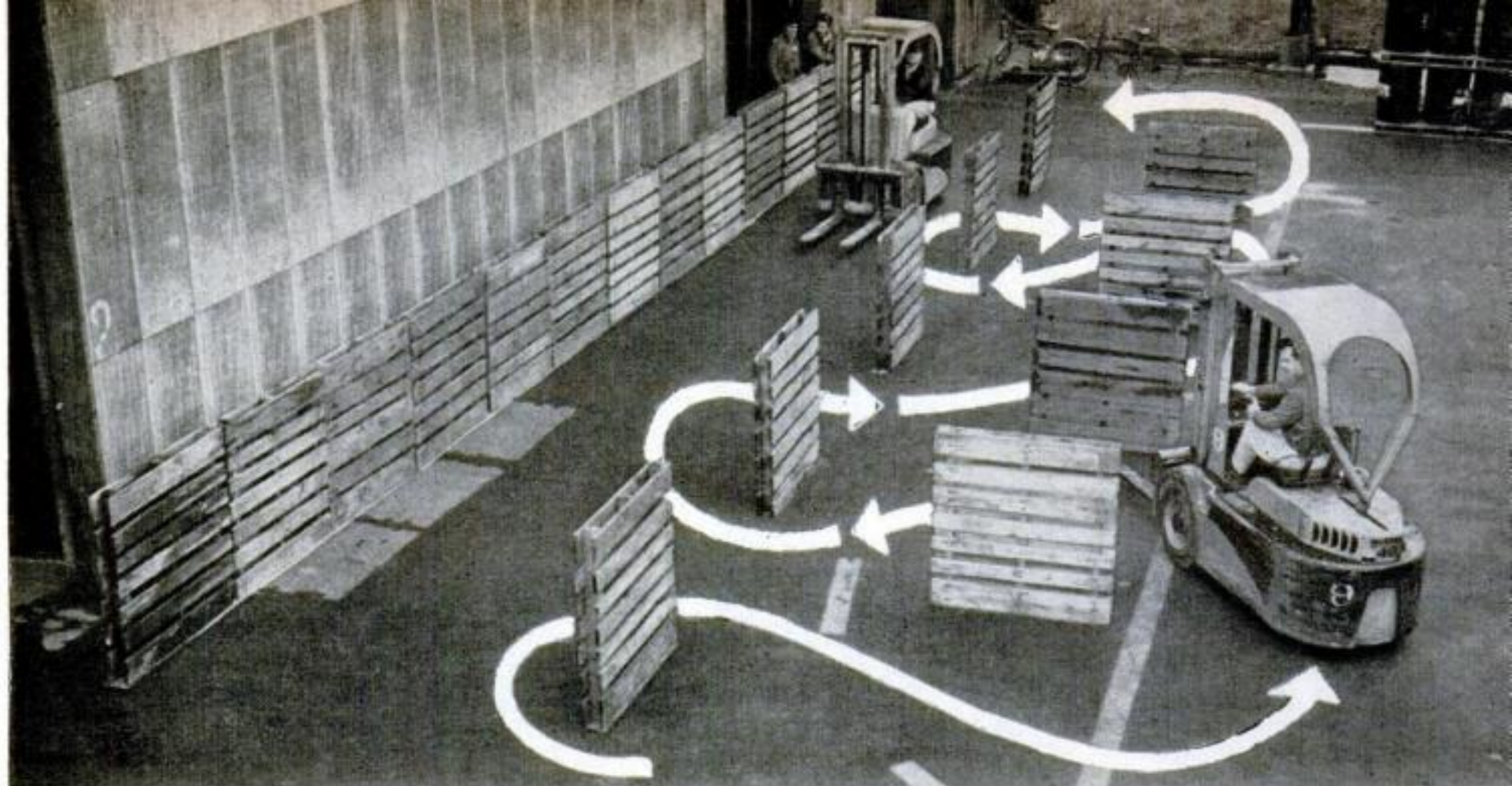
COLUMNS of air hold up the building below, 80 feet long and as big as a four-room house. It's a portable darkroom and briefing tent, made for the Air Force by B. F. Goodrich Co. The supporting columns are U-shaped tubes of rubberized nylon and glass fiber inflated with three pounds of air. The 740-lb. structure, which uses 320 feet of zippers, packs in eight bags (right).



Locked Blocks Need No Mortar

NEW concrete blocks that fit so tightly they need no mortar make it easy for amateurs to erect strong and straight masonry walls like the one at top. The secret is a tongue-and-groove joint—somewhat like that used in cabinetmaking—that locks the blocks together as above. Mastic, applied to the joints with a caulking gun, prevents water seepage. A special machine, sold by Hydro-Forged Stone Associates, Cleveland, forms each block under 150 tons pressure to a tolerance of .005". No exterior or interior finish is needed, says the manufacturer, who claims costs far below those of brick or lumber construction.





Skill of lift-truck operators is tested on complicated route (arrows) through obstacle course.

Obstacles Test Fork Drivers

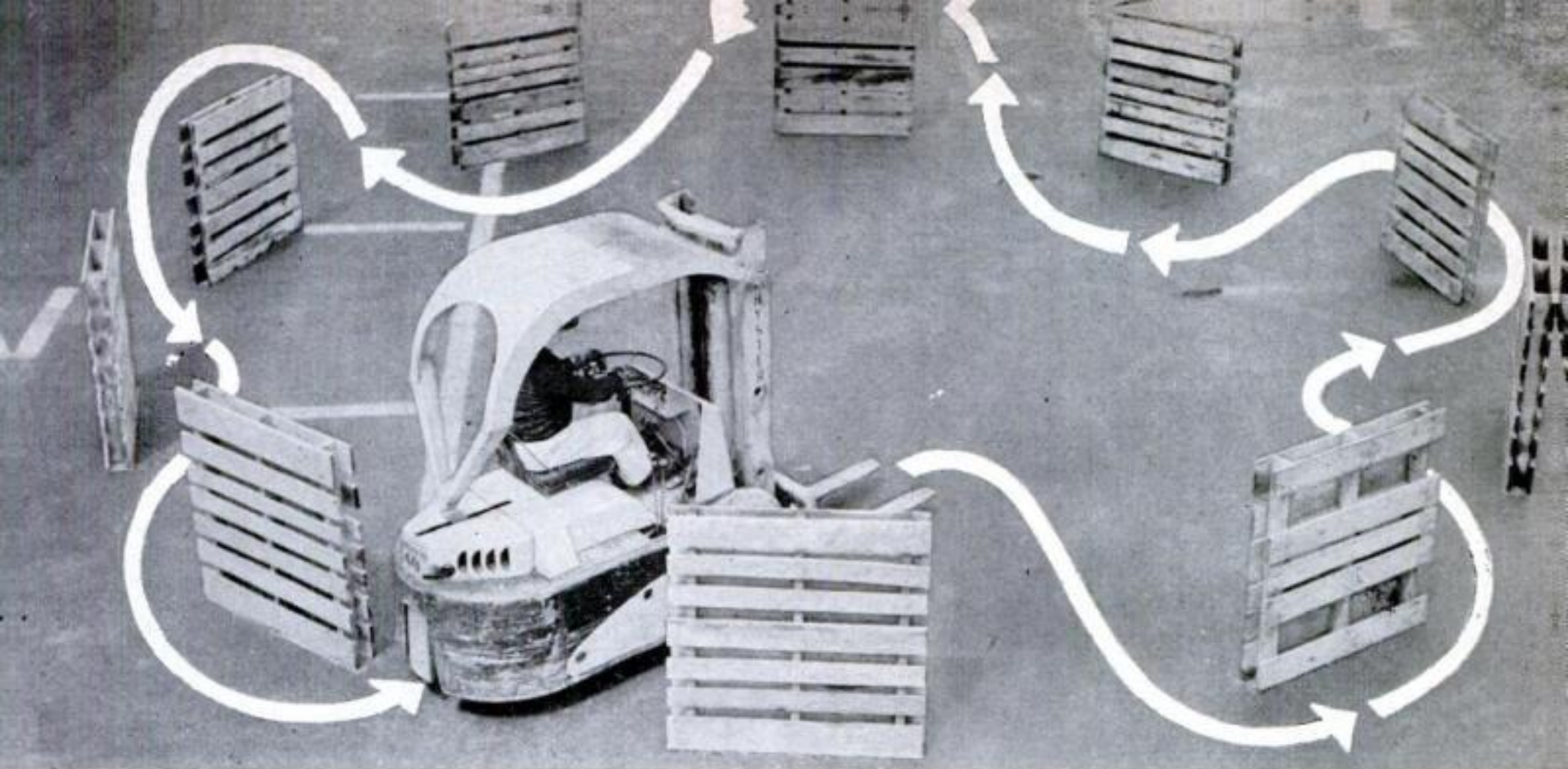


How'd you like to try this one? Operators must carry load down 40-foot aisle—there's two-inch clearance—drop the load, back up and raise forks, pick up load again, and back all way out.

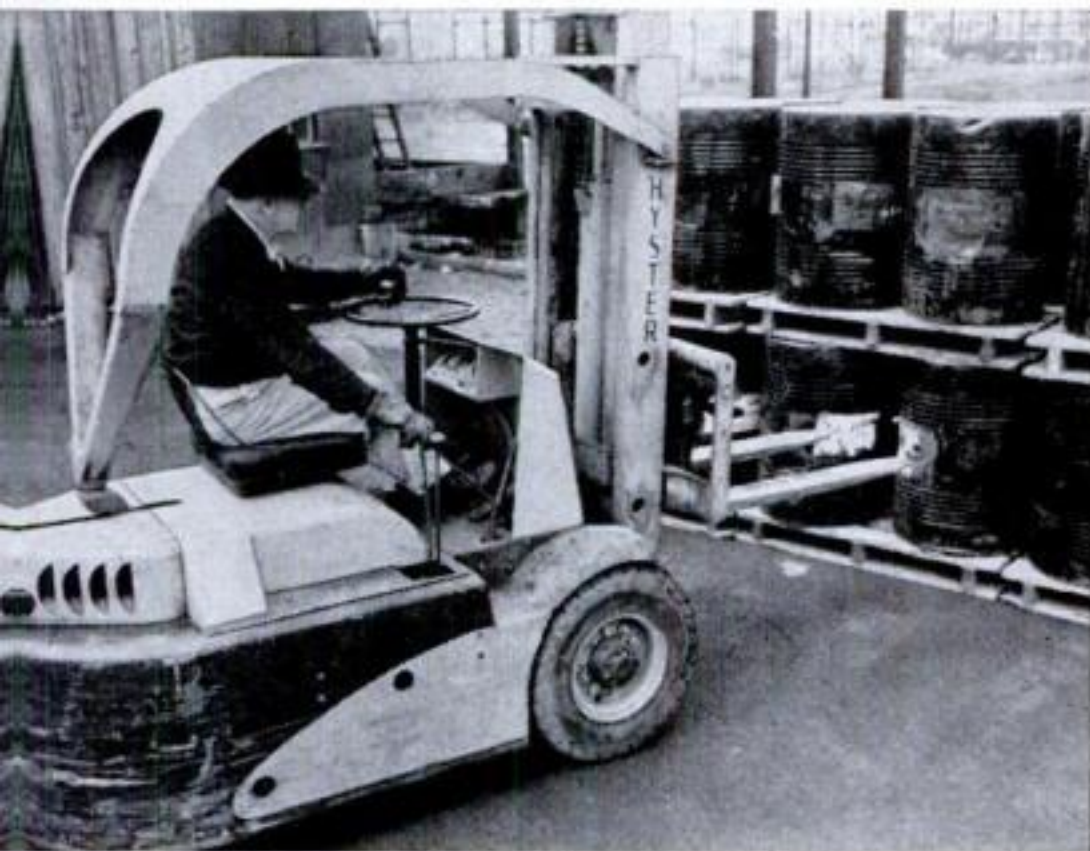
BROKEN-FIELD running is hard enough in a football game. But imagine trying it on a motor scooter toting a load of barrels! That's what operators of fork-lift trucks at the Esso Standard Oil Co.'s Bayway Refinery have to do.

Their motorized broken-field running is done on an obstacle course made by lining up pallets—wooden load platforms. Here their skill at maneuvering the trucks in tight quarters is tested as part of a safety training program. Actually, the warehouses where they work every day offer almost as difficult obstacle courses—narrow aisles and doorways obstructed by pillars and stacks of goods.

These tricky little trucks, so valuable to industry for their amazing talent at shuffling man-crushing loads, can also be very dangerous if improperly handled. The cramped working quarters and quick-turning ability of the trucks make collisions with people or obstructions all too easy. Loads can topple off or upset the trucks. Even when parked, the trucks can be a hazard—passersby may trip over the forks. The Bayway training program was started after three serious accidents—in one the operator was killed—underscored these dangers.



Lift trucks can turn sharp corners—but there is only inches clearance between obstacles.



1 Marty Ryan, foreman at the Bayway plant, shows how the truck can pick up that center drum stack. Here he sets forks to pallet level.



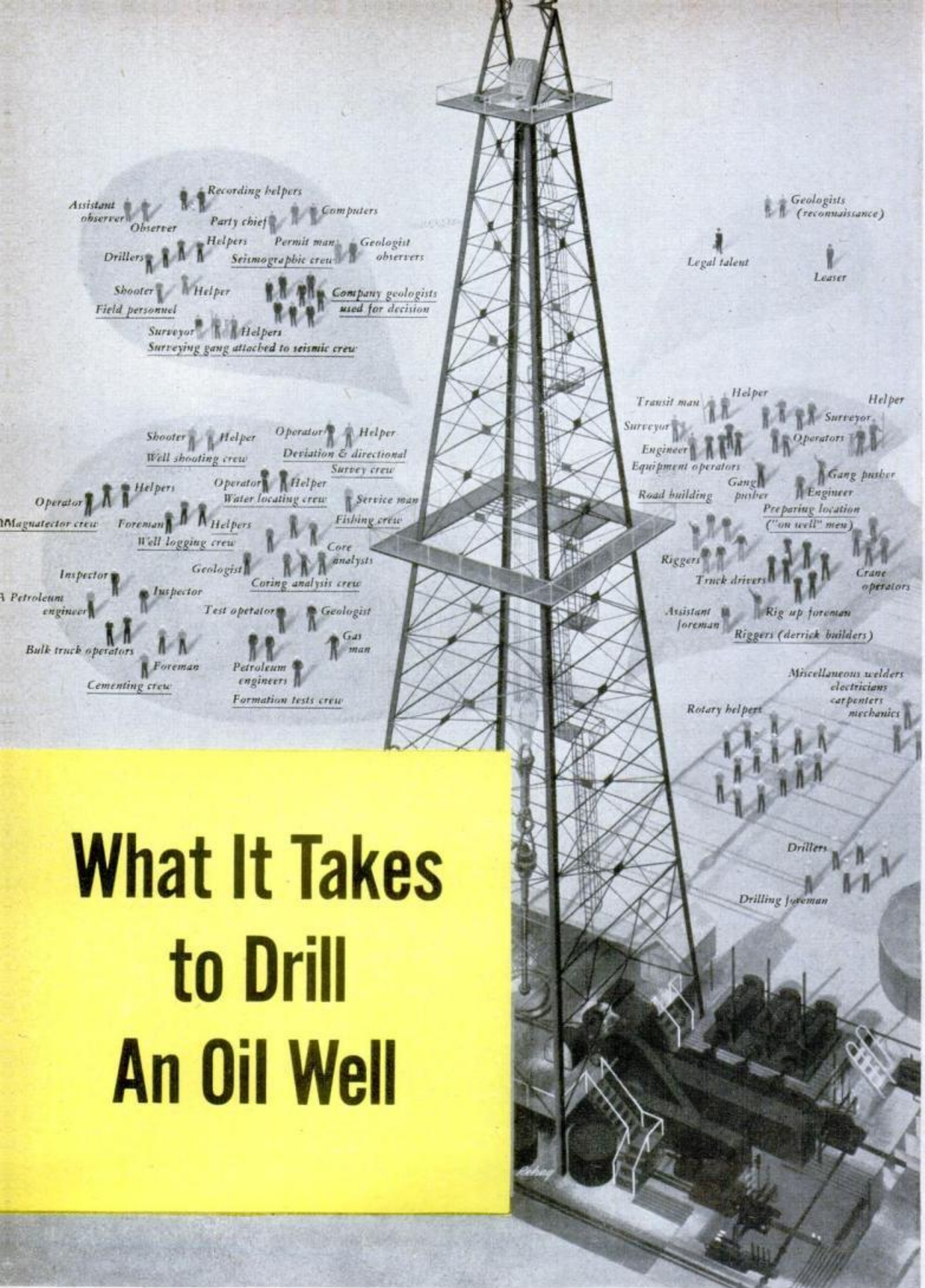
2 Next he lets the truck coast forward until the forks slide all the way into the slots in the pallet. Forks must be centered under load.



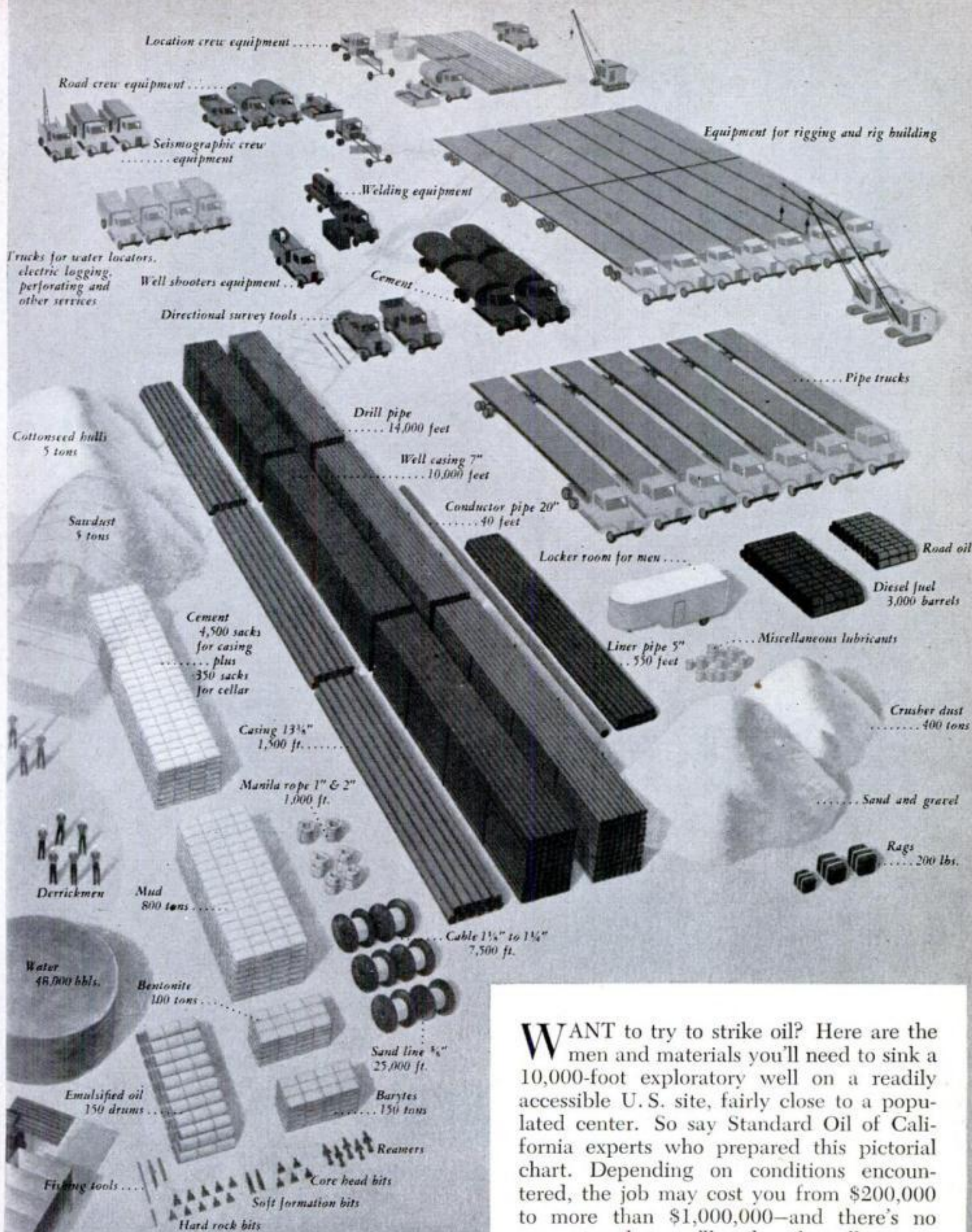
3 Whole frame tilts back to cradle load on forks as it is lifted. Outside lever controls amount of tilt; inner lever raises, lowers forks.



4 Then truck is backed out and clear of stack. Forks will be lowered to within few inches of ground so operator can see over load.



What It Takes to Drill An Oil Well



WANT to try to strike oil? Here are the men and materials you'll need to sink a 10,000-foot exploratory well on a readily accessible U.S. site, fairly close to a populated center. So say Standard Oil of California experts who prepared this pictorial chart. Depending on conditions encountered, the job may cost you from \$200,000 to more than \$1,000,000—and there's no guarantee that you'll strike oil at all.

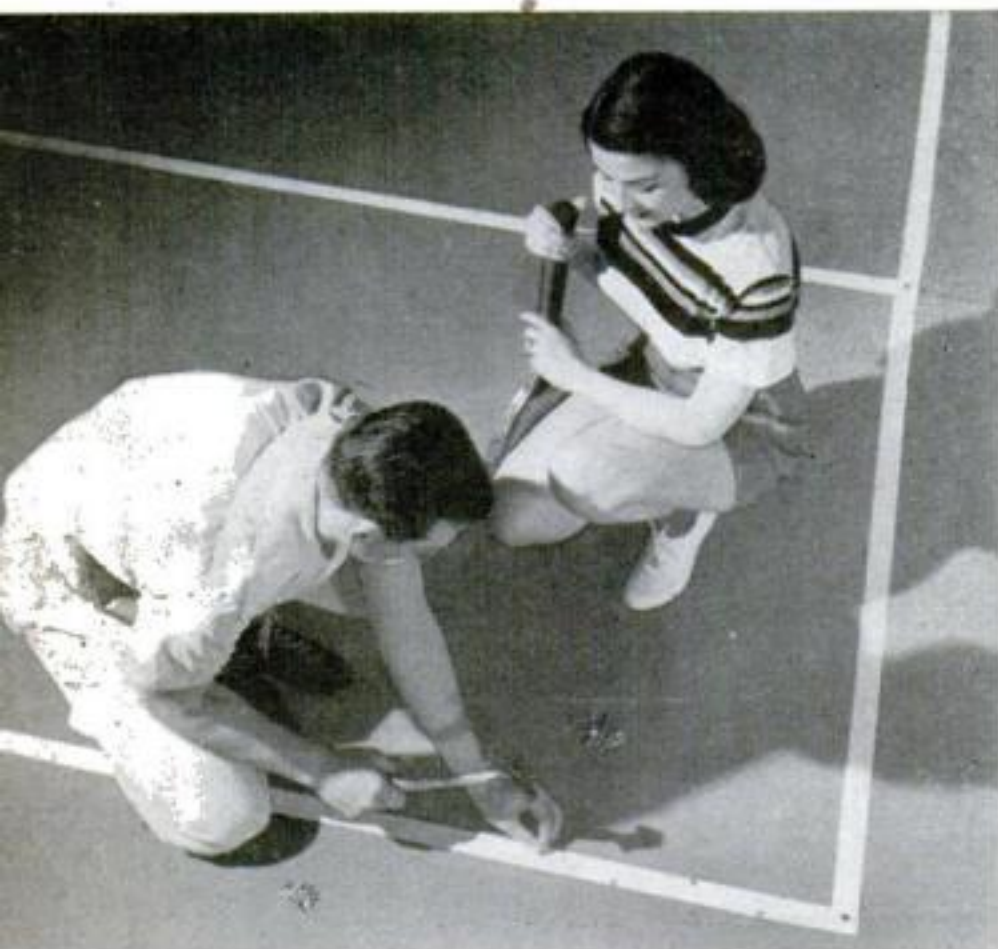


Pre-Assembled Rig Saves Time

WHEN Shell Oil Co. prospectors make wildcat tests on the plains of West Texas, they take along a drilling rig that's already assembled. This way they don't have to take it apart and put it together again every time they move. During the moving operation, known as "skidding a derrick," the rig is raised by jacks, and endless-track belts are placed underneath it, as at left. A tractor then pulls the rig away.

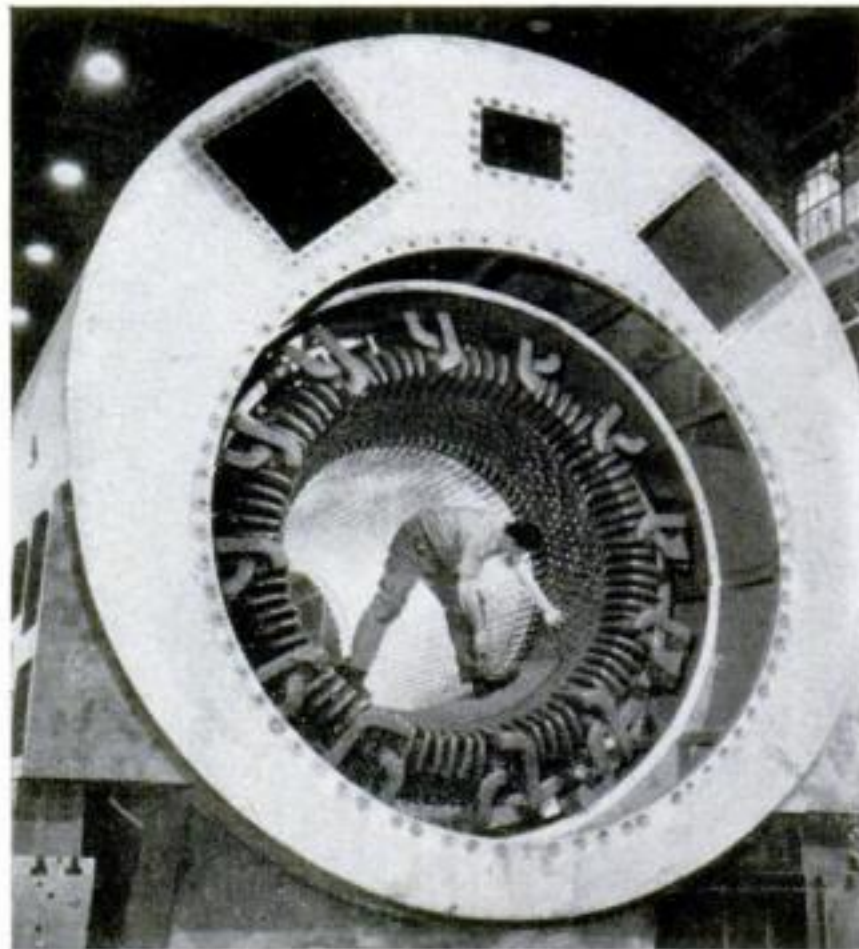
Streamlined Motor Scooter

SHAPED like a rocket, the motor scooter at right is said to travel about 95 miles on a gallon of fuel, and to have a top speed of 40 miles per hour. Made in Germany, the scooter has a 120-cubic-centimeter engine. It sells for less than \$300.



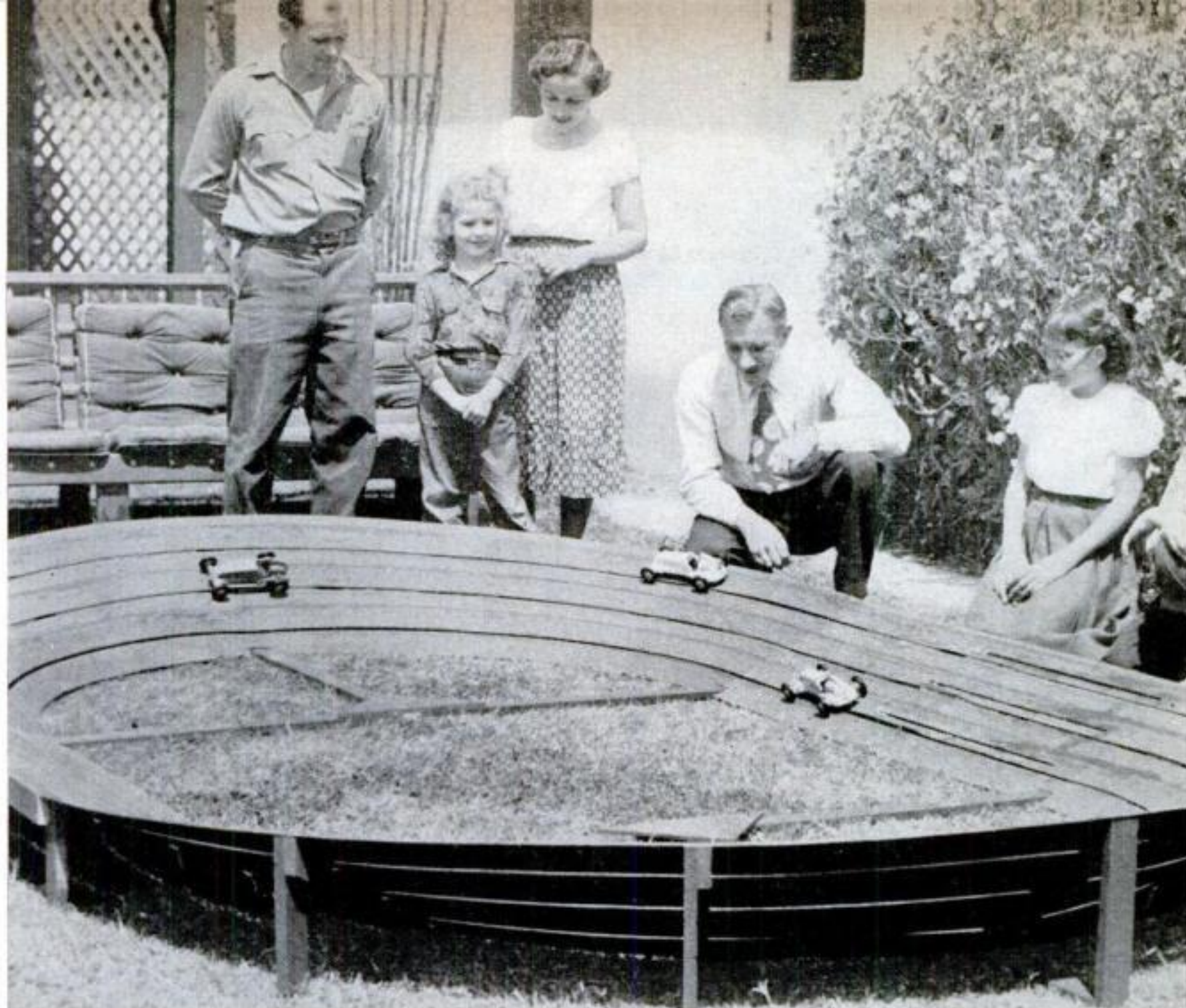
Plastic Tapes Tennis Courts

LINES marked on a tennis court with this new vinyl tape are said to stay white longer and to resist chemicals, sunlight, and dampness. Here a heavy-duty type is being hammered into the ground with aluminum nails driven through holes at two-inch intervals. A lighter grade is stapled down. Rex Corp., Cambridge, Mass., makes the tape.



Generator Uses New Insulation

THE workman inside this huge 100,000 kilowatt Westinghouse generator is checking the stator coils impregnated with a new insulation that is expected to last 10 times longer than previous types. Called Therma-lastic, it consists of mica flakes imbedded in synthetic resin that "stretches" to expand and contract with the generator coils.



Three miniature racers compete in back-yard version of the Indianapolis Speedway classic.

Autos Race In Your Back Yard

NOW you can get all the thrills of high-speed auto racing without leaving your back yard. Engines scarcely larger than your thumb drive model racers around a track with a 40° bank at 30 miles an hour. The track comes in six sections, and in bad weather you can set it up in the garage or store it away in the attic. You can either buy the midget racers ready-made, or just get a power package, complete with engine and driving wheels, and build the body. L. M. Cox, Santa Ana, Calif., dreamed up the Thimble Drome.

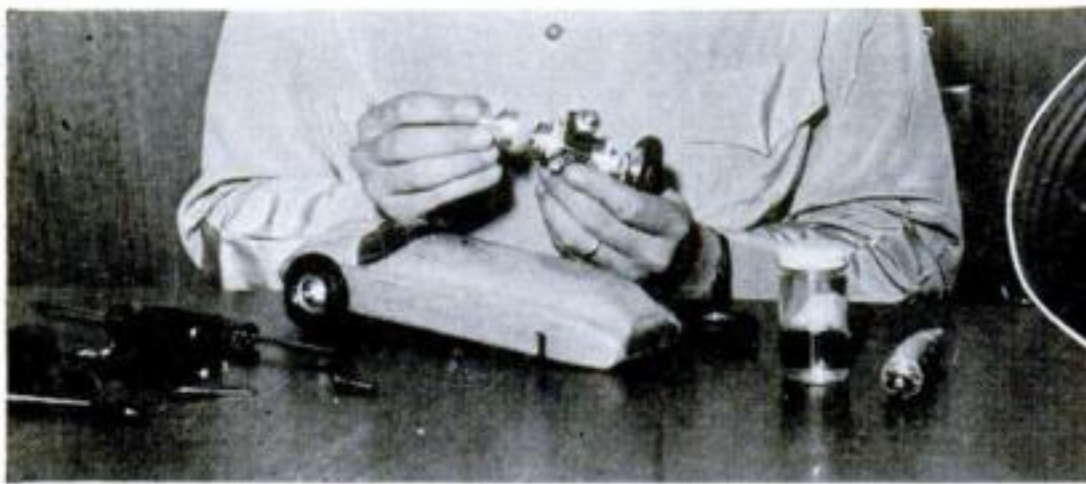


Ralph DePalma, veteran racing driver, examines a fancy version of the midget. The cars burn castor oil and alcohol, put out 1/24 hp. at 20,000 r.p.m. *[Continued on next page]*

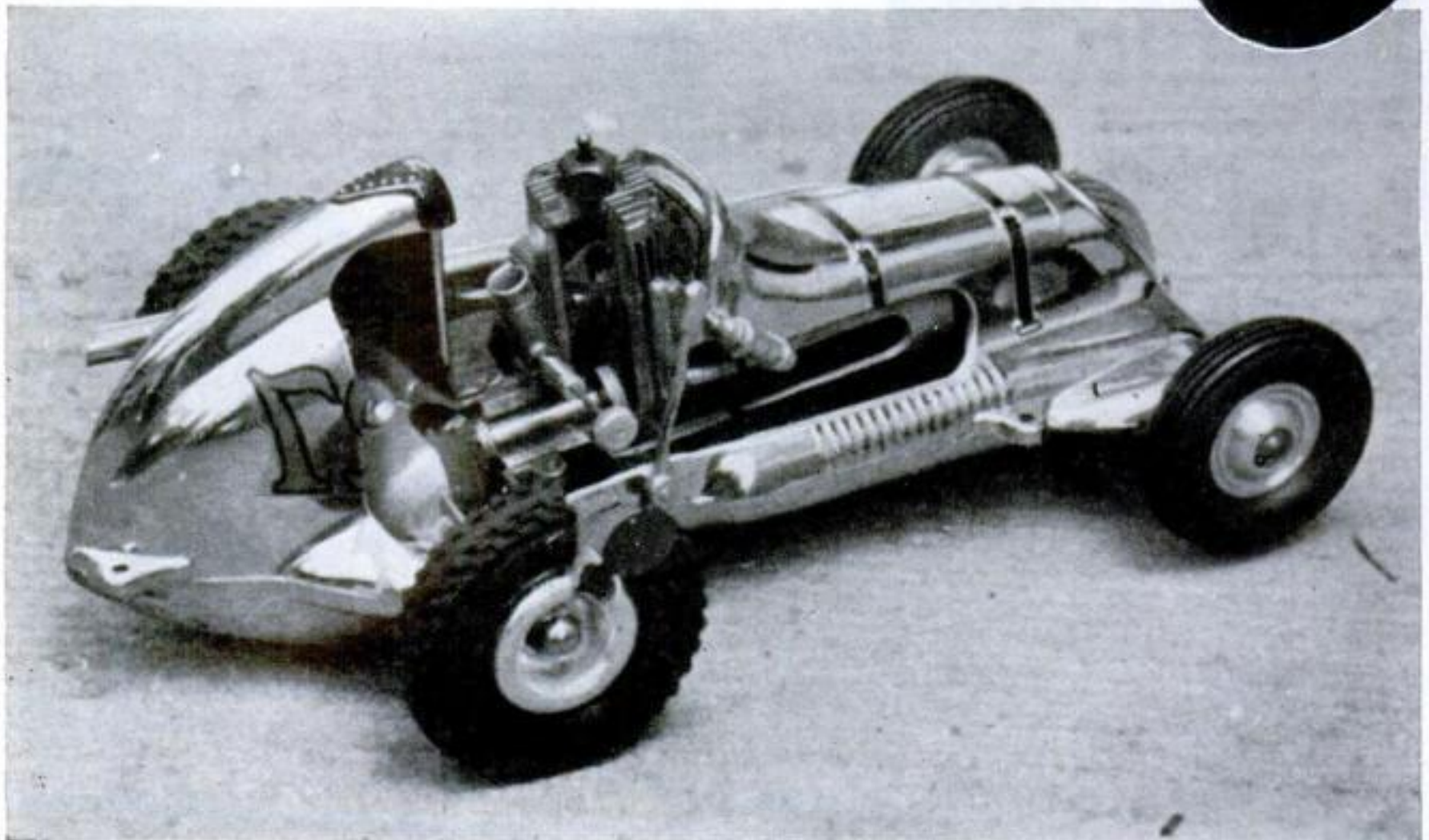
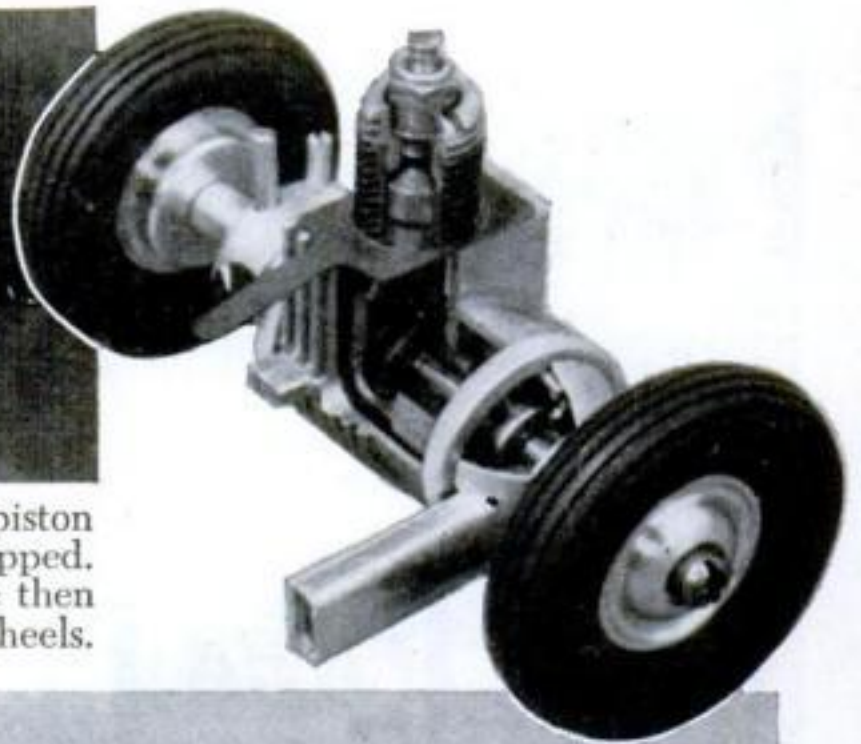


Young drivers line up their entries at the starting post. Guide pins in track slots keep the

cars in line along the closed-circuit course. Mufflers as big as two kitchen matches lessen noise.



Two-cycle engine has $\frac{3}{8}$ -in. bore, .416-in. stroke, piston displacement of .045 cu. in. Cylinder and piston are lapped. Battery heats glow plug to fire fuel in starting; engine then has self-ignition. A 4-to-1 planetary-gear rig drives wheels.



Rear end of miniature racer is cut away to show how power plant is mounted in the body.



The Quintot high chair serves baby at meal-time. It will double as a car seat, and adjustable back and footrest make it a temporary bed.



When the chair is lifted off its tablelike base, the unit is turned into a table-and-chair set for an older child. Tabletop is plastic veneer.

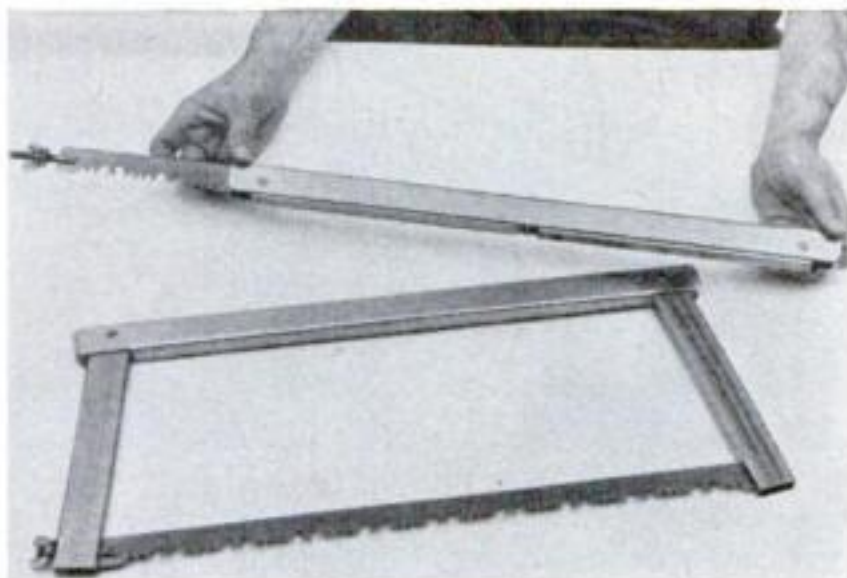
High Chair Fills Many Jobs

THIS new high chair takes care of many of the activities of small fry. When the chair is unclamped from its tablelike base and set down beside it, the unit becomes a table-and-chair set for big brother. By itself, the chair serves as an auto seat for Junior. And when slipped into a special wheel frame, it becomes the seat in a stroller. Weighing 45 lb., Quintot is made of tubular steel, and has plastic upholstery. The unit collapses into a package that can be stored in a closet or car trunk. It is priced at about \$44 by the Juvenile Furniture Guild, of Newark, N. J.



Inserted into a carriage base of chromium-plated steel tubing, the chair becomes a reversible seat in a stroller. A canopy, as well as mother's market basket, can be attached.

Saw for Campers Folds like Jackknife



OUTDOORSMAN Charles Peters found it a chore to chop big logs into firewood with an ax when on camping trips, so he invented a 2½-lb. folding saw to do the job. To use the saw you pull out its retractable blade from the folded frame, as at top left, unfold the frame like a jackknife, and slip the blade into notches at the frame ends. Tightening a wing nut puts the proper tension on the blade. Available from Peters Enterprises, of Staten Island, N.Y., the folding saw comes in two sizes for cutting 8- and 10-inch logs. It is priced at about \$6.

New Boxcar Gives Freight "Pullman" Ride



By Sheldon M. Gallagher

PS photos by W. W. Morris

FRAGILE freight gets a Pullman-style ride in this new high-speed, smooth-riding boxcar. Designed to eliminate damage to cargoes in transit—which every year costs railroads more than \$100,000,000—the new "Damage-Free" car is equipped with a special load-bracing device.

This is a system of crossbars that lock into rails in the walls, pinning the cargo firmly in place and permitting full use of the car without loss of space. It also eliminates the need for dunnage—the wood, rope, and steel straps usually used to secure cargoes—which averages \$46.50 a carload.

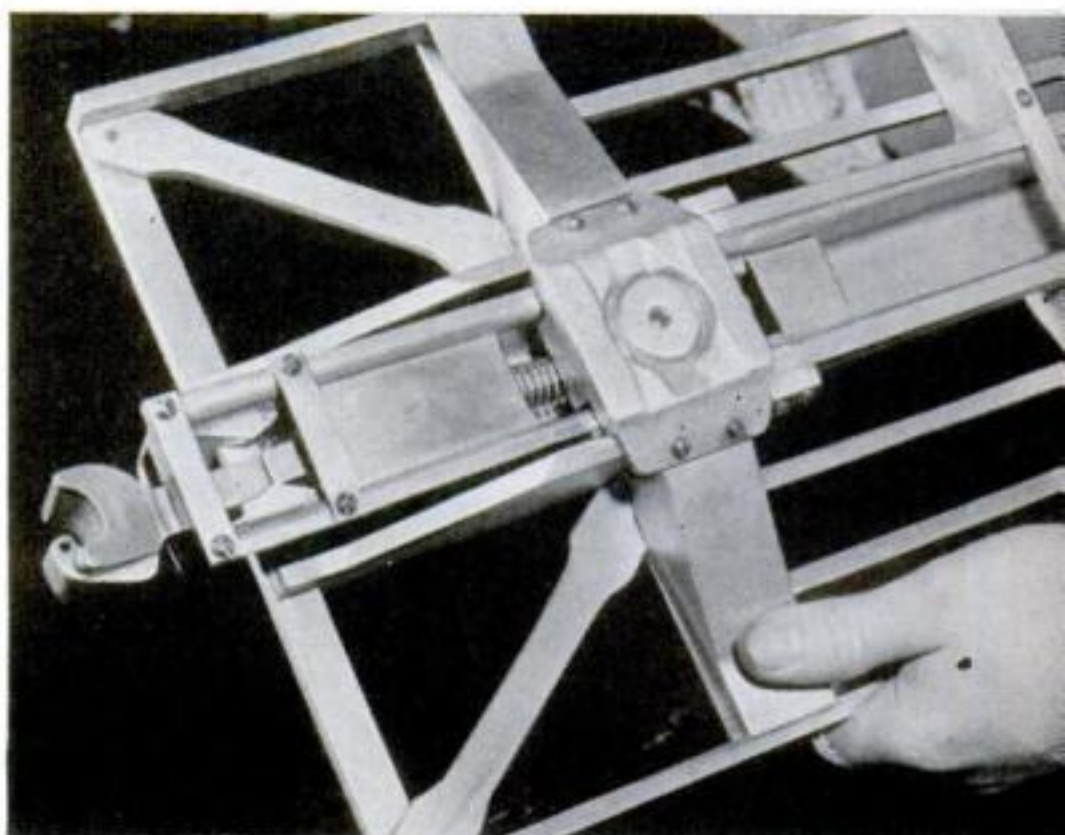
Special wheel trucks, designed by Chrysler, enable the new car to travel at passenger-train speeds up to 90 m.p.h. without damaging the cargo. Instead of resting on top of the wheels, the car body is suspended between them on U-shaped hangers. This allows the trucks to move from side to side, like pendulums, absorbing lateral shocks, while the car body remains stationary. Because a pendulum always swings at the same rate regardless of its weight, the action of the trucks is just the same for an empty car as a full one. By simply jacking up one end of the car, two men can replace a worn set of wheels in about 15 minutes—nearly as fast as you can change a tire on your car.

Built by the General American-Evans Co., of Detroit, the 50-foot, all-steel car, called the GAEX-DF, is 10 feet longer than ordinary boxcars. Extra-wide, eight-foot doors give easy access for large, mechanized load-

ing devices. The greater length and tighter packing enable the car to carry a 50-percent larger payload. And because of its increased speed, the car can average 100 miles a day, compared to 41 for ordinary cars.

What will all this mean to the railroads? The difference, perhaps, between profit and loss, say the car's designers. The company plans to create a pool of the cars and lease them to the railroads as they are needed. A hundred are already on order, and if enough are put into use, the company believes that railroad earnings, which average 3.6 percent, may be boosted to 6 percent.

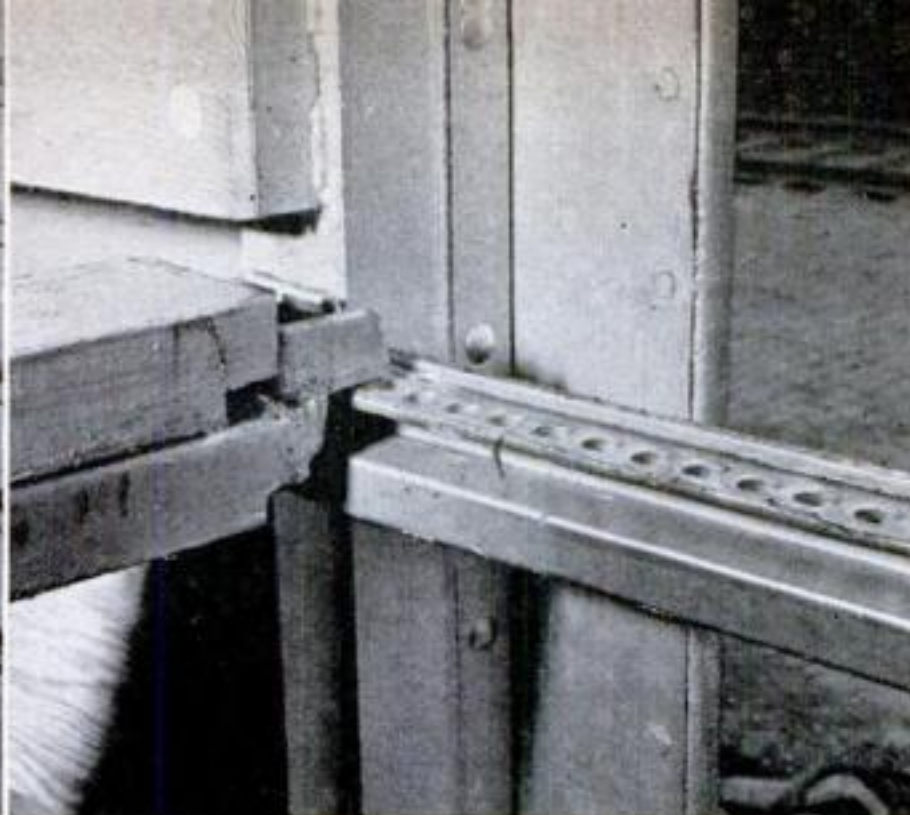
Move over, passengers, and make room for some fast freight!



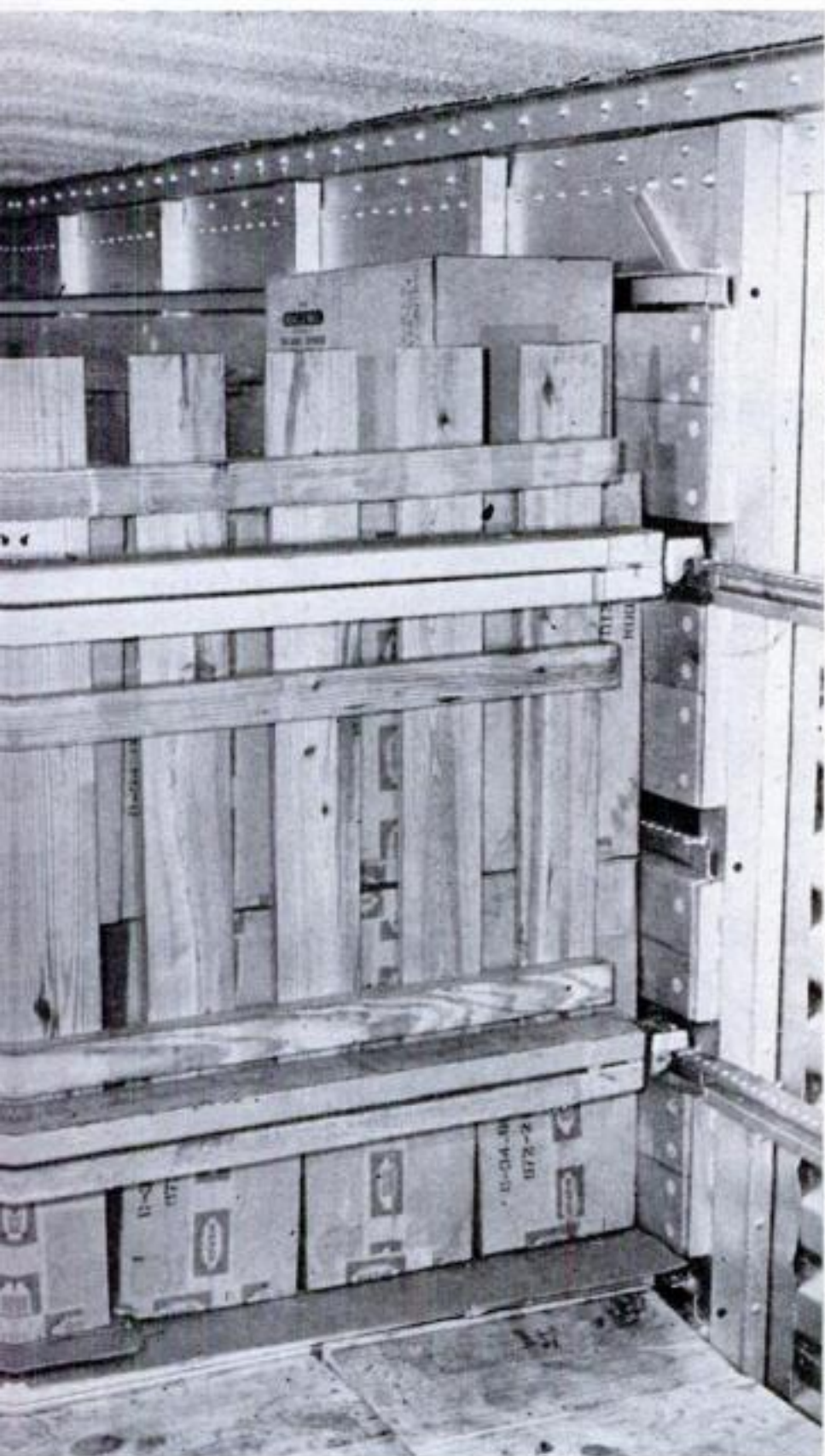
Unique center beam, shown in model of under-frame above, runs full length of car. Held to frame by springs, it slides in and out to absorb shocks of coupling and sudden starts and stops.



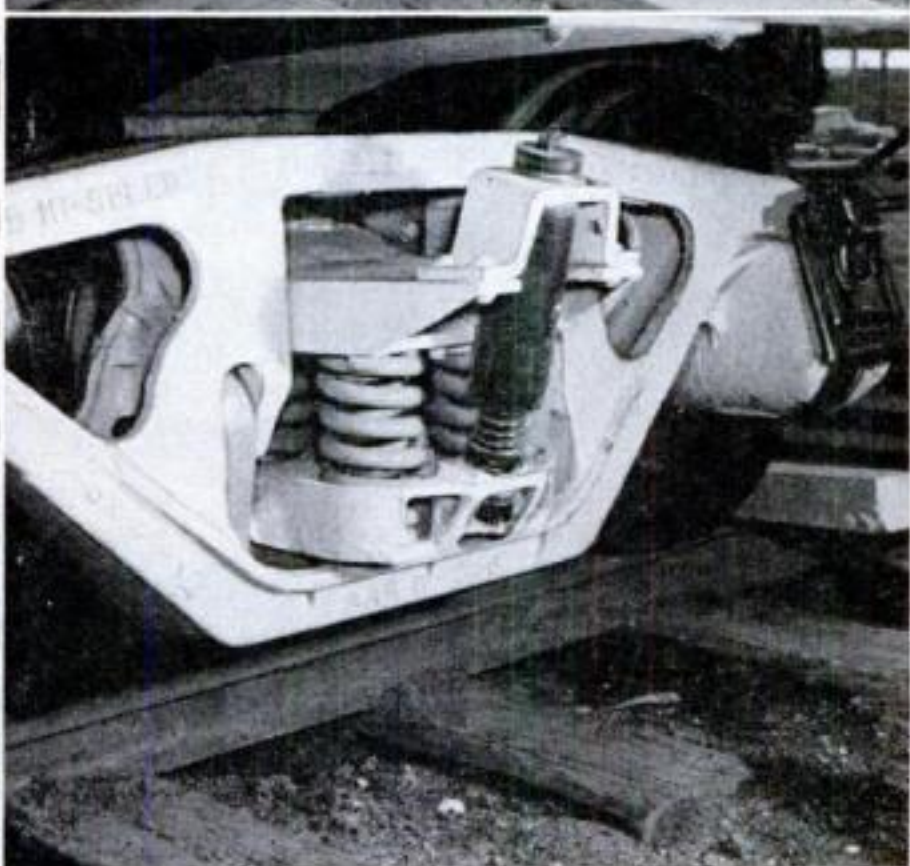
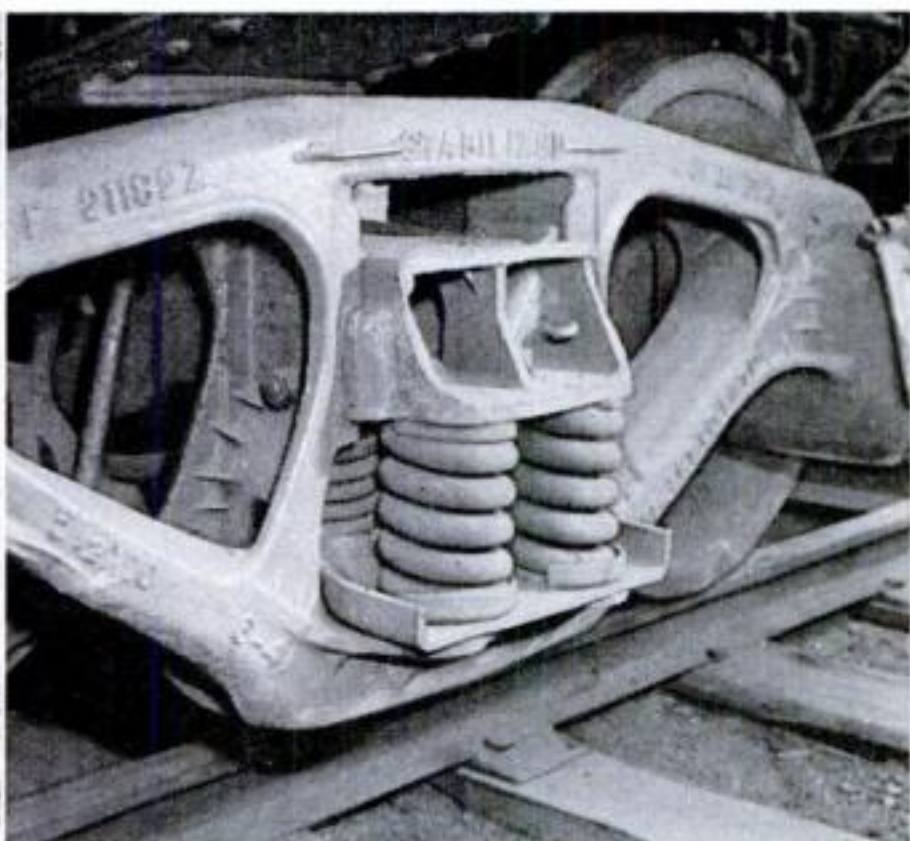
Crossbars are supported by steel rails, spaced about a foot apart, that run full length of car's walls. Note how wooden deck, laid over bars, can be used to make platform at any level.



Prongs on each end of crossbar lock into holes in wall rails, holding crossbar fast at any point. Wall rails run across doors to permit full loading of car, but are removable for access.



Partly loaded car shows how crossbars pin cargo firmly in place. Note how a wooden deck, laid over crossbars in photo at top to make platform, is here used upright to form bulkhead.



Conventional truck (top) moves only vertically. New one (bottom) moves sideways as well to absorb lateral shocks. Cylinder in foreground is snubber to damp springs, stop bounce.

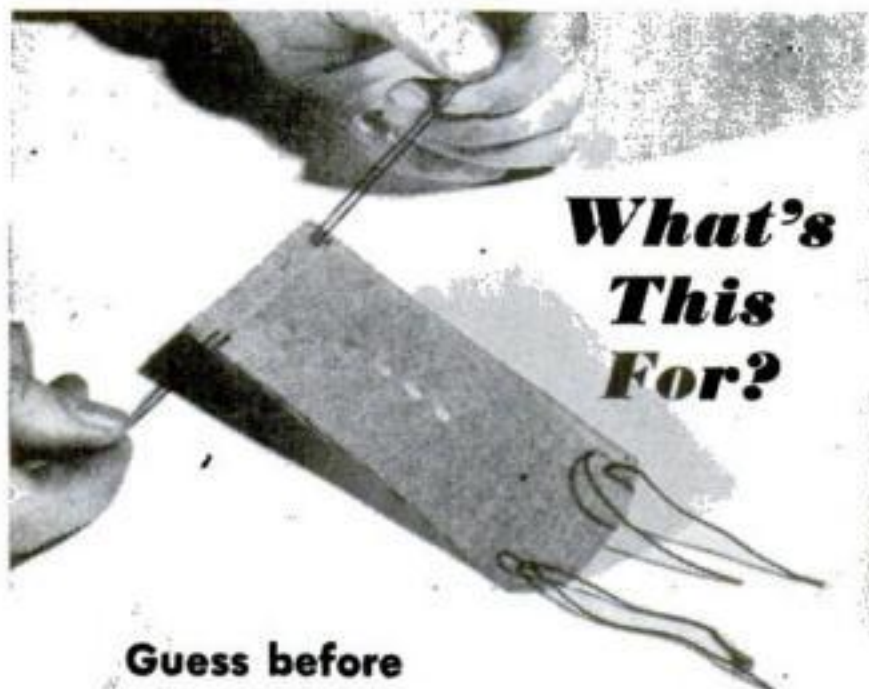


Baby 'Dozer Does Big Jobs

THIS baby bulldozer can do most of the things its big brothers can do but on a smaller scale. It's intended for use by builders, landscapers, and gardeners. For digging, filling, and hauling, its hydraulically operated dump bucket can lift up to 500 lb. and hold $4\frac{1}{2}$ cu. ft. For grading, a 'dozer blade can replace the bucket. For snow removal, a plow can be attached. Powered by a single-cylinder, 5-hp. gas engine, the 'dozer is only 3 feet wide and 5 feet long, yet has an 800-lb. drawbar pull. Made by Mead Specialties, of Chicago, it sells, with bucket lift, for about \$975.

Cab Cuts Traffic

DESIGNED to lessen traffic congestion, this small Austin taxicab has just been approved for use in New York's crowded streets. About four feet shorter than conventional cabs, it seats five passengers and turns in a 26-foot circle. Its 70-hp. engine averages 14 miles to the gallon, compared to 8 for other cabs.



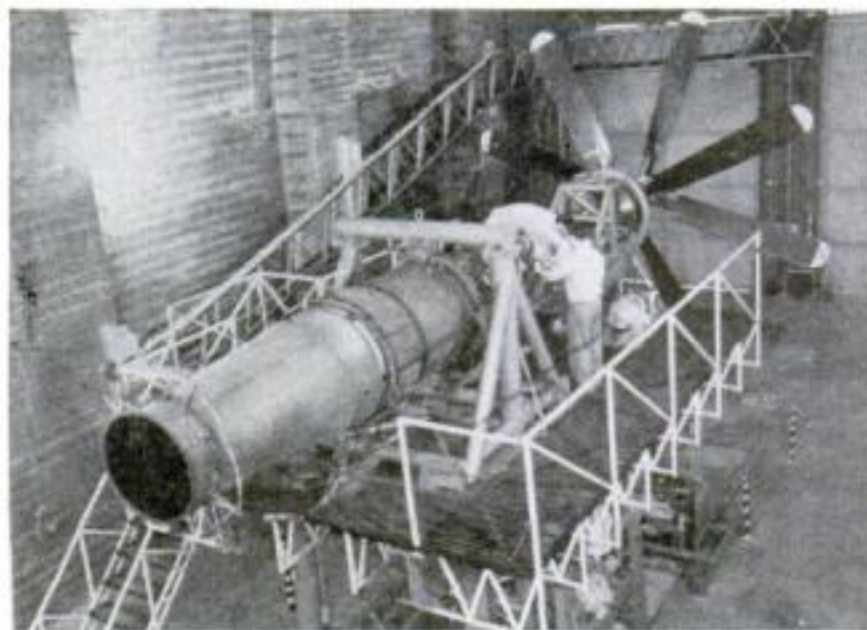
**What's
This
For?**

**Guess before
you read
below**

It's a fly swatter for cows. A leather pouch containing absorbent material inside, it's saturated with fly ointment and then tied to the animal's tail. When Bossie swishes her tail, she spreads the insecticide over her body, killing the flies. Its name is Humane Fly Pad.

World's Mightiest Turboprop

Most powerful aircraft engine of its type, a new Air Force turboprop power plant has delivered more than 10,000 hp. during tests. Still experimental, the XT-37 Turbodyne is shown below in its test bed fitted to a 16-ft. contrarotating propeller. Built by the Turbodyne Corp., Hawthorne, Calif., it is the first of its kind designed for tractor or pusher use without modification.



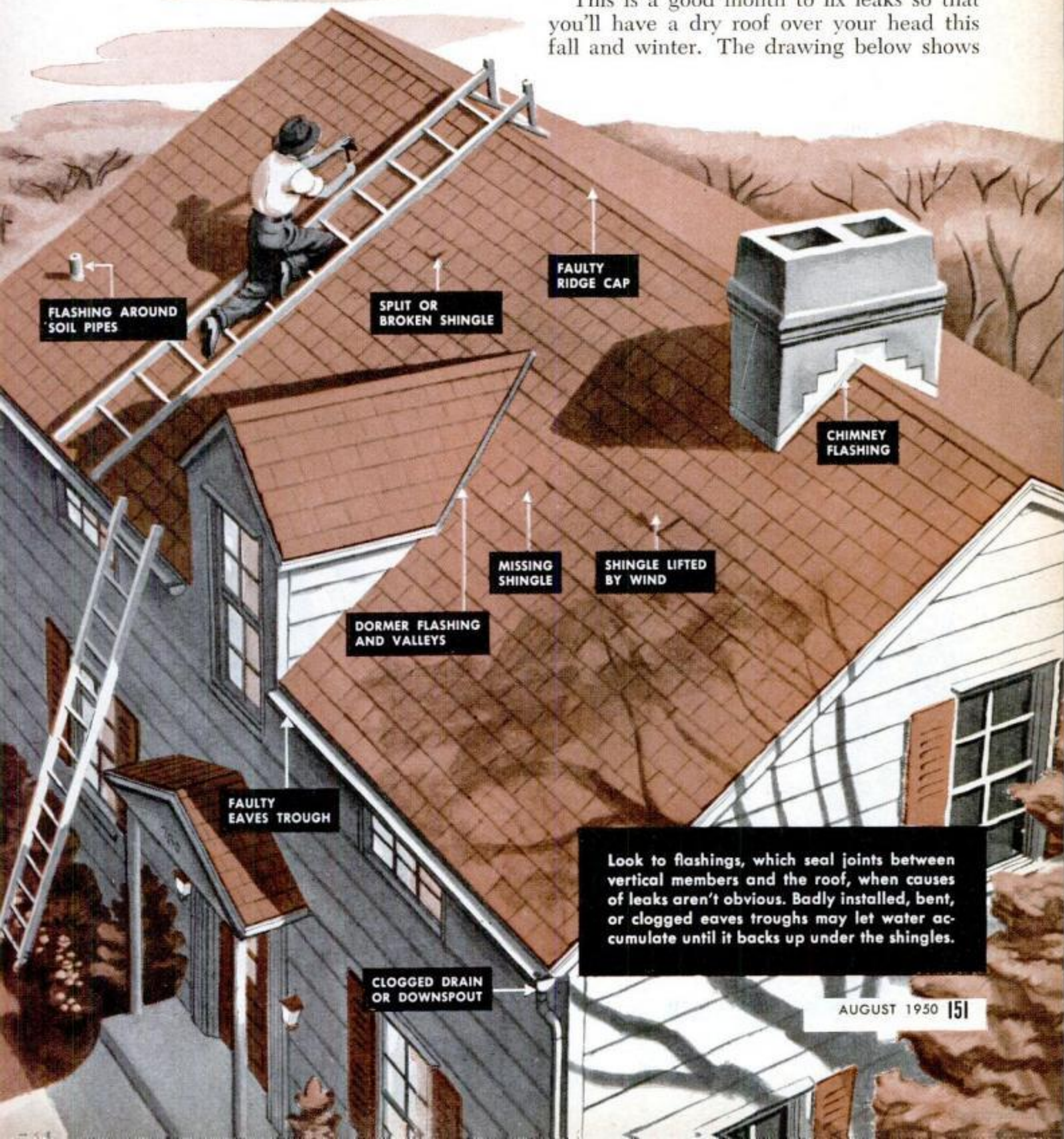
Fix Your Roof Yourself

By George H. Waltz, Jr.

Now's the time to spot those leaks and prepare your house against fall rains.

RAIN on the roof has a cozy sound only while it stays out. When it's plunking into a bucket set under a leak, it's yelling for roof repairs. Those drips can cost you real money in damaged plaster and wall-paper.

This is a good month to fix leaks so that you'll have a dry roof over your head this fall and winter. The drawing below shows



Look to flashings, which seal joints between vertical members and the roof, when causes of leaks aren't obvious. Badly installed, bent, or clogged eaves troughs may let water accumulate until it backs up under the shingles.

nine common causes of leaks. Next time you have to hunt up a bucket, grab a handful of wire scraps, long nails, hairpins too, and head for the attic.

If yours is an open, unfinished attic, some leaks may show as water spots and drips. The tip-off may be as obvious as a glint of daylight through the shingles. More often it takes a bit of detective work to trace a trickle back to the hole it started from. Water can run a long way down the rafters before hopping off or soaking into a wall or floor.

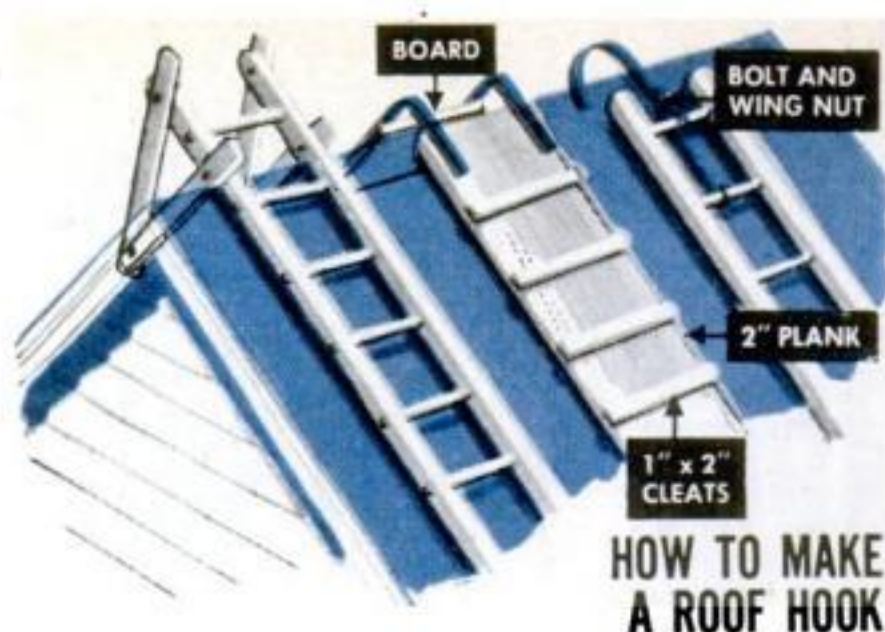
When you find the villain of the piece, poke a bit of wire, a nail, or a straightened hairpin through to locate the leak on the outside of the roof.

Shingles Can Be Troublemakers

If you have a finished attic, or one you can't enter, you can only localize the leak roughly. Then you'll have to find it from on top of the roof, remembering that water runs downhill but can change course sharply at valleys—those angles formed by two roof slopes, or by the roof and a dormer.

If you have a wood-shingle roof, you will probably find that most of the leaks you've marked are caused by split, warped, or loose shingles. In any case, you won't find the repair too difficult if you equip yourself with the proper tools.

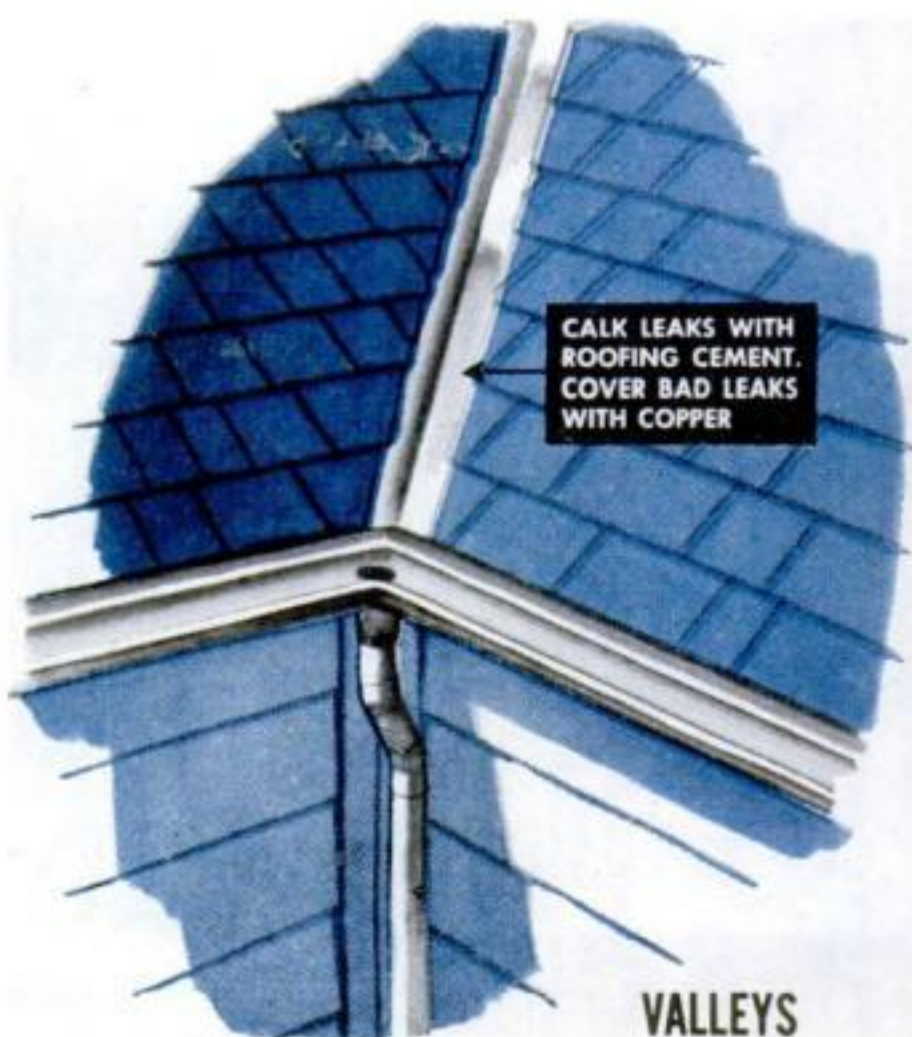
First on the list should be a pair of rubber-soled shoes—preferably sneakers. They will give you a safer footing and will also



protect the surface of the roof. Hard-soled shoes are not only slippery but may damage the shingles.

Next, you'll need a roof hook to help you clamber up and down the slope of the roof. This can be a ladder with a forged hook or a wooden one, as shown in the drawing, or a 2-in. plank fitted with cleats and a pair of improvised hooks to fit the peak. If possible, the ladder or plank should be as long as the roof's slope. Then, by moving the hook where you want it, you can reach any point on the roof quite safely.

You'll also need a hammer, a small hatchet, a chisel, a metal-cutting saw or a roofer's ripper (a special hooked cutter used to cut off the tops of old shingle nails), tin snips, some galvanized tin or sheet copper, a can of roofing cement, a can of roof paint, shingle nails, and, of course, some spare shingles.



First check the metal flashings around the chimney, soil pipes or other vents, and where any slope of the roof meets a vertical surface. "Hard-to-locate" leaks generally can be traced to faulty flashing. Fill any cracks or open joints with roofing cement and then coat the entire flashing with good roof paint.

If you find a leak in a metal valley—the drainway where two roof slopes come together at an angle—coat the spot with roofing cement and cover it with a piece of galvanized tin or copper. Make the patch of the same metal as the valley. Bend it to fit and fasten it in place with zinc-coated roofing nails. Coat the patch, particularly the edges and nail heads, with more roofing cement and paint with roofing paint. This same technique can be used to patch tin decks over porches and the like.

Two Ways to Fix Wood Shingle

If your general inspection uncovers a cracked wood shingle, it can be repaired in either of two ways. If it is not too badly cracked, two 3" by 8" strips of galvanized tin or copper generally will do the trick. Drive one sheet up under the split shingle until its lower edge is flush with the edge of the shingle, and drive the second up under the shingle directly above so as to cover the hidden part of the crack. To get the sheets started, you may have to pry the lower edges of the shingles up a bit with a chisel. But don't pry any more than you have to.

A shingle that is badly cracked and warped should be removed and replaced. To do this, carefully split the shingle into small bits with a hatchet or a chisel and remove the pieces. Then, using a metal-cutting saw, or a hacksaw blade fitted with some sort of handle that will allow you to work up under the shingles immediately above, cut off the tops of the two old shingle nails.

You may want to dip the new shingle in preservative, or otherwise color it to match the rest of the roof, so that it won't be conspicuous. After the new shingle has been slipped into place, fasten it by driving an ordinary nail down through the space between the two adjoining shingles above it. Remember that the joints between shingles shouldn't be aligned within three courses; even if aligned joints are a course apart, the splitting of the shingle between could create a leak. Finally, to prevent any possibility of rain leaking through the nail hole, drive a

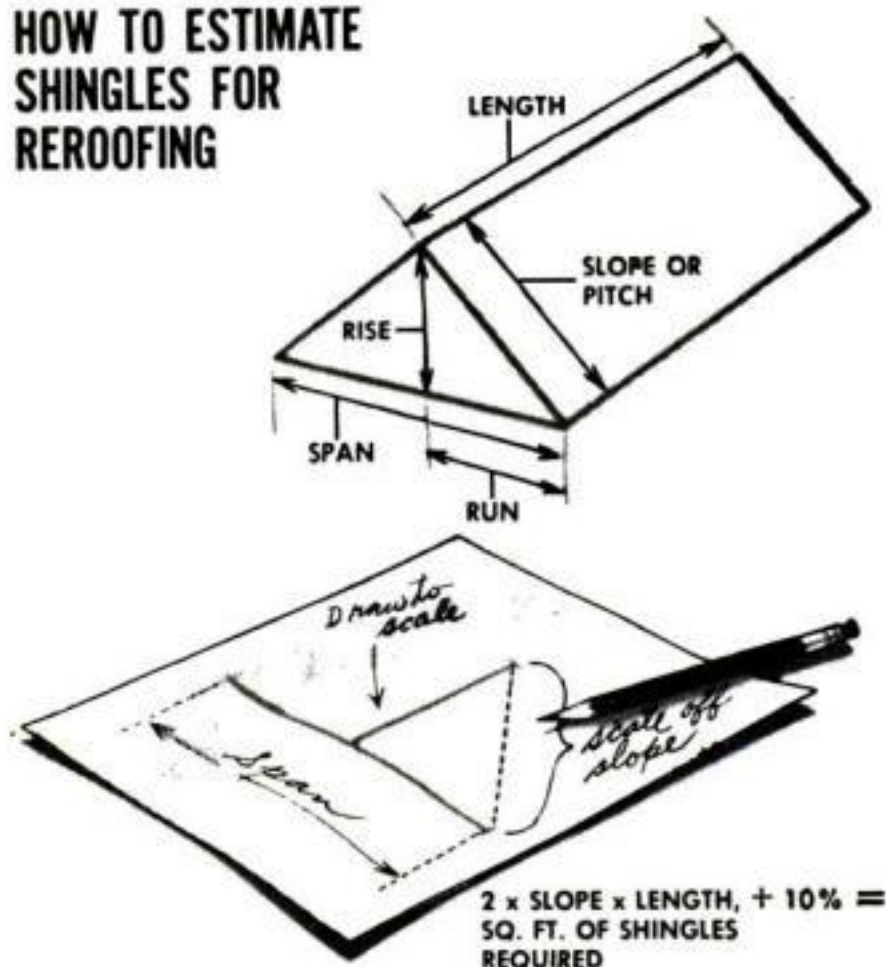
HOW TO REPAIR A CRACKED WOOD SHINGLE



STEPS IN REPLACING A WOOD SHINGLE



HOW TO ESTIMATE SHINGLES FOR REROOFING



strip of tin or copper up under the shingle above to cover the nail head.

Repairs to a damaged shingle on a composition roof can be made in much the same way. Single asbestos-cement shingles can be replaced just like wooden ones. Asphalt shingles, however, are usually in the form of two- or three-tab shingle strips. With these, the entire strip containing the damaged shingle will have to be removed and replaced.

If you've decided that it's about time you replaced your old wood shingle roof with a composition roof, your first chore will be to

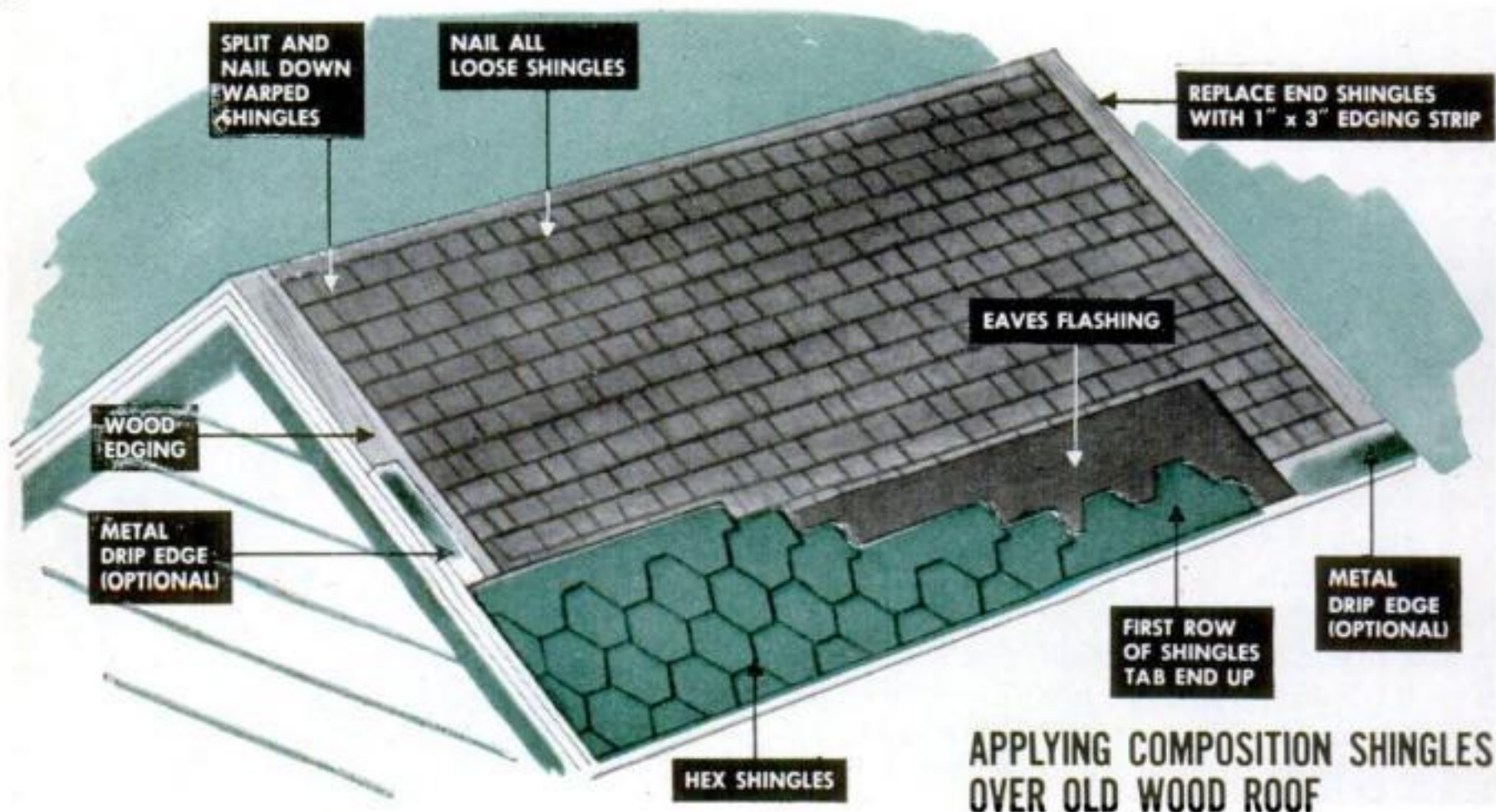
figure out just how much roofing material you will need. That means you will have to know the roof's length and its pitch or slope (distance from peak or ridge to eaves). The length is easy to estimate by measuring your attic floor. The slope, however, is hard to get at with a rule. One way is to measure the rise (the height) and the span (the width) in your attic and then make a scale drawing on which you can measure the slope to scale with fair accuracy. Multiply the slope by the length, double it for a simple gabled roof, and you have the total roof area. No matter what figure you arrive at, add about 10 percent to be on the safe side.

Buy by the Square

In buying shingles, you will find that they are sold in "squares." A square is the amount of roofing needed to cover 100 sq. ft. of roof area. Since the type and design of shingle varies, the number of bundles to a square also varies.

In most cases, if your old wood-shingle roof is not too badly deteriorated, composition shingles can be applied right over the old roof, but it first should be properly prepared. Loose nails should be replaced, protruding nails should be driven home, loose shingles should be nailed, warped shingles should be split so they will lie flat and should be nailed, and missing shingles should be replaced. Both the appearance and durability of your new roof will depend to a great extent on how well the old roof surface is put in shape.

END





Tables From Floor Boards

WE NEEDED a lawn table near our fireplace. A set of unused rowboat floor boards caught my eye, and an hour later we had the very handy table you see above. I cut the legs and braces from slim cedar poles.

Furniture used on an uneven lawn often acts like a seesaw. I fixed that by trimming each leg with an ax to a moderately tapering point. Now when the table is moved, we need only press on it. It seats itself solidly and doesn't teeter.—*Hubert V. Coryell, Pasadena, Calif.*

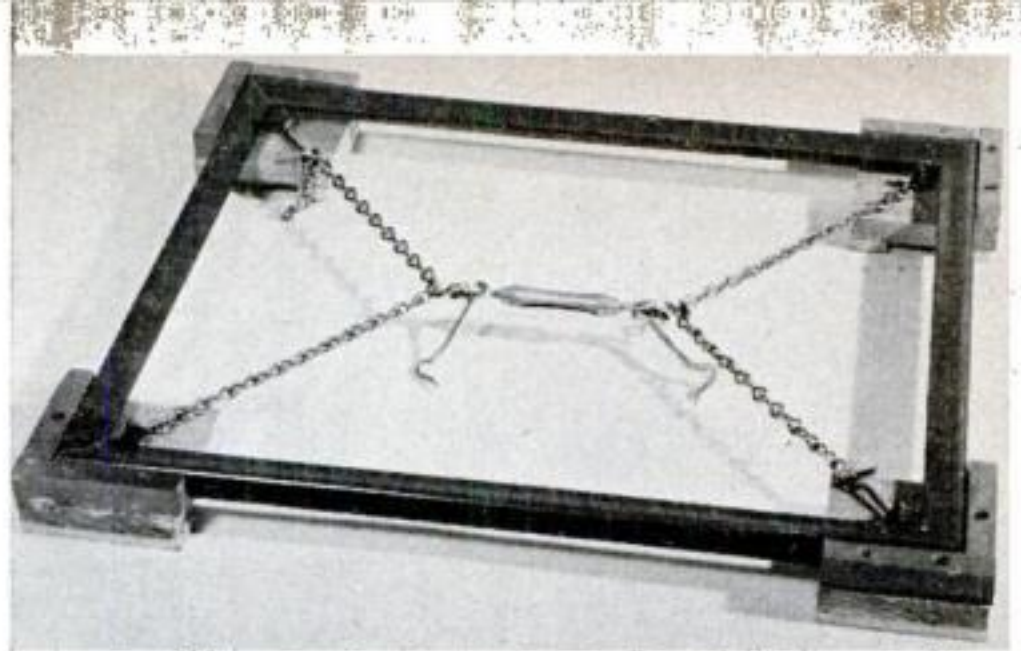
Sanding Dust Fills Holes

I ALWAYS save the sanding dust when I build or repair furniture. It comes in handy for filling small brad holes or cracks. After sanding any fine hardwood, I collect the dust and store it in a labeled jar. To make wood filler I mix two parts of dust to one part of powdered phenolic-resin glue, then add water carefully. The filler matches the wood on which it's used and is almost indistinguishable.—*J. B. Leeth, Cullman, Ala.*

Mixing Tool Swirls Paint



FAN-SHAPED blades on the new paint stirrer at left agitate the paint when you move the handle up and down. The Rotoswirl is made by Elmhurst Specialties, Peoria, Ill. A set of two handles and three blades—to fit pint, quart, and gallon paint cans—sells for \$1.50.



Frame Clamp Is Adjustable

WITH about 50 cents and a few minutes work, you can solve one of the most annoying problems in woodworking: how to clamp a mitered-corner picture frame until the glue sets. Cut four hardwood blocks and screw two strips of wood to each block in the shape of a right angle. Now obtain two lengths of chain and bolt one end of each chain to one of the blocks. Attach door hooks to the other two blocks.

In use, the chains are hooked to the blocks and joined at the center by a turnbuckle and S-hooks. You can attach long hooks to the buckle to accommodate long frames.—*C. A. Veburg, Omaha, Nebr.*



Pad Paints Wood Trim Faster

THIS 25-cent tool makes it easier to paint door and window frames and other trim. It's called the Painter's Pal, and consists of a woolen applicator pad cemented to an aluminum handle. The Leonard Company, Des Moines, Iowa, manufactures it.



Under-Sink Cabinet Adds Storage Space

An old fixture modernized will make any housewife's daily work easier.

By Harold Jackson

WHEN we remodeled our kitchen, one of the first fixtures to go down to the basement was the old sink. Instead of selling it to the junkman or piling it in a corner, I installed it in the basement where I built this cabinet for it.

Even if you get a new sink for the kitchen, boxing the old one in with a cabinet will make it much more useful and attractive. Cleaning materials, brushes, and buckets can be kept out of sight behind doors.

In our basement, the old sink takes care of dirty jobs that would muss up the kitchen or bathroom. It comes in handy at canning time when there's lots of fruit and vegetables to be prepared. And when the kids come in from play, they wash up in the basement where a little splashing doesn't matter. I use it, too, after a session in my workshop. If you decide to put an extra sink in the basement, you can usually pick one up for a few dollars at a second-hand store.

The drawing on the opposite page gives you the dimensions I used, but measure your own sink carefully before you start to build a cabinet for it. This cabinet was built for a 20" by 42" sink, but you'll probably want to modify it somewhat.

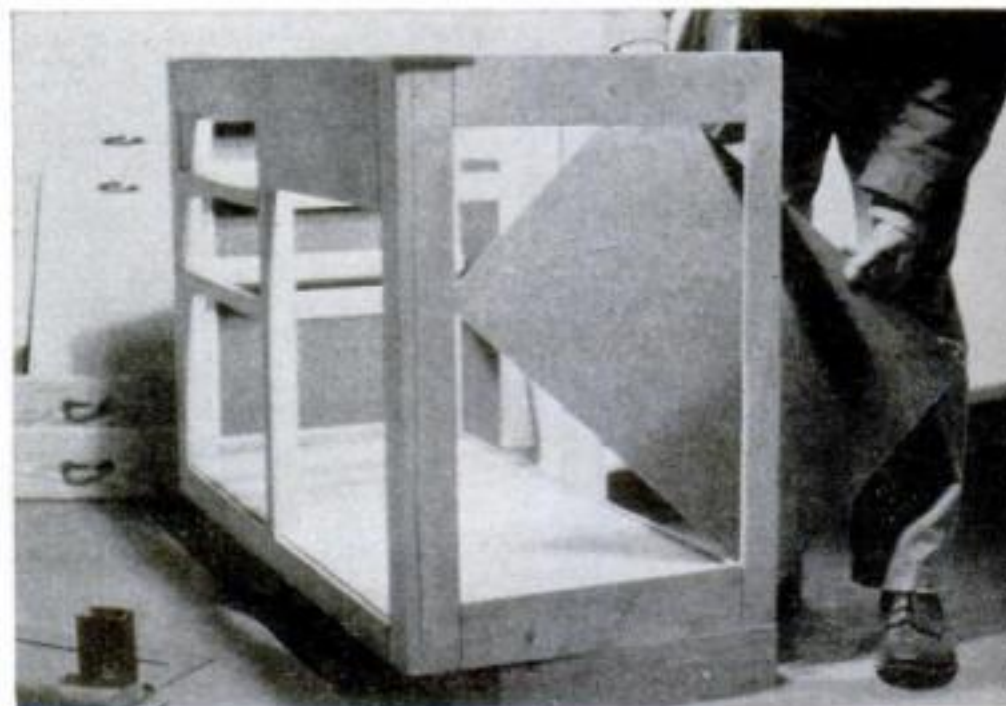
All parts of the frame, except the drawer slides, are $\frac{3}{4}$ " stock. The drawer slides are 1" by $1\frac{1}{2}$ " with a $\frac{1}{2}$ " by $\frac{1}{2}$ " rabbet. End and back panels are $\frac{3}{16}$ " composition board.

The base of the cabinet—also made of $\frac{3}{4}$ "

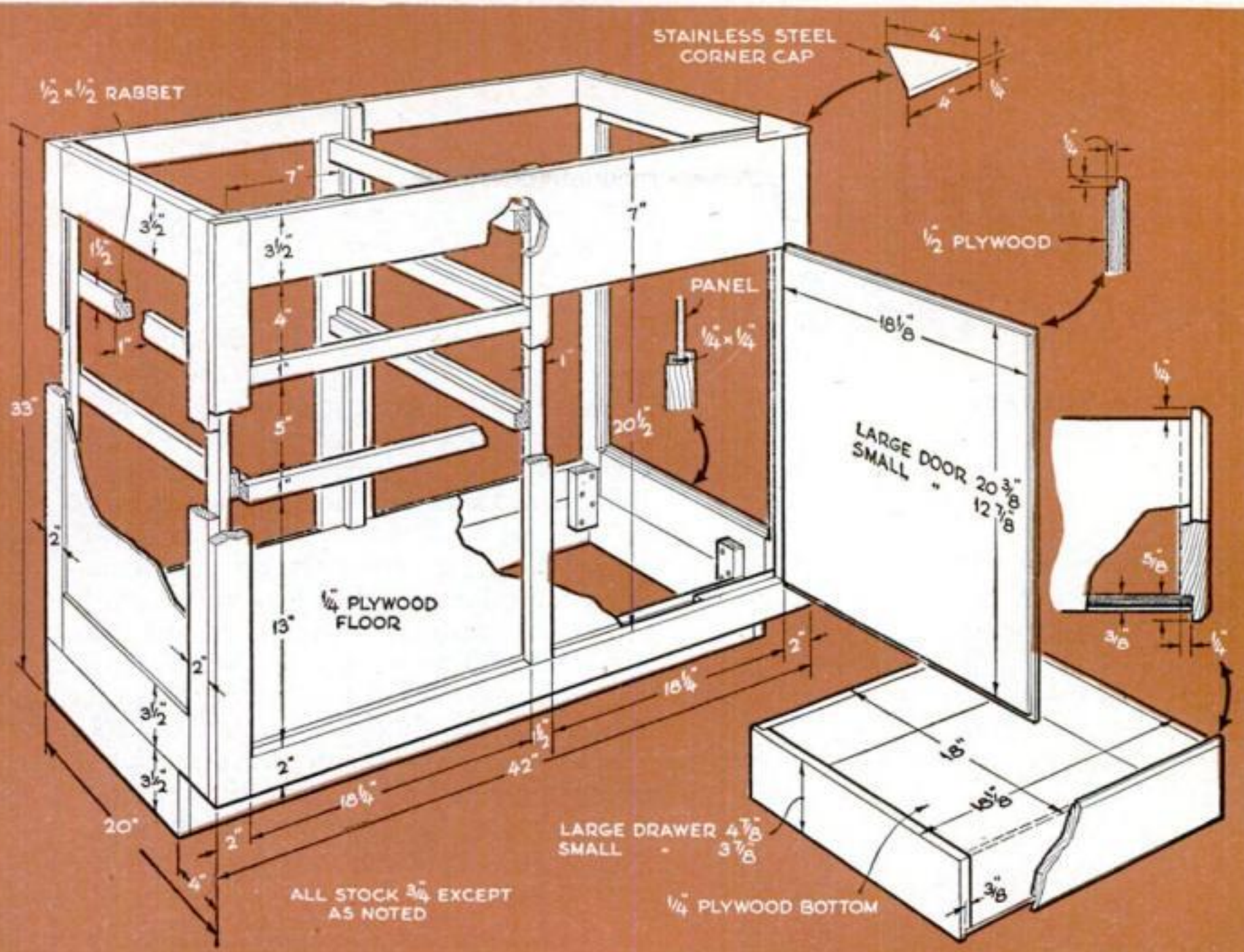


boards—is 42" long but only 16" wide, 4" less than the width of the upper part of the cabinet. This leaves space for your toes under the front of the cabinet. Blocks attached with screws on the inside secure the base.

Details of the drawers are shown in the drawing. The dimensions of the drawers are identical except for a 1" difference in height.



Framework of cabinet looked like this before end panels were installed. Panels fit in rabbets and are held in place by $\frac{1}{4}$ " by $\frac{1}{4}$ " strips.

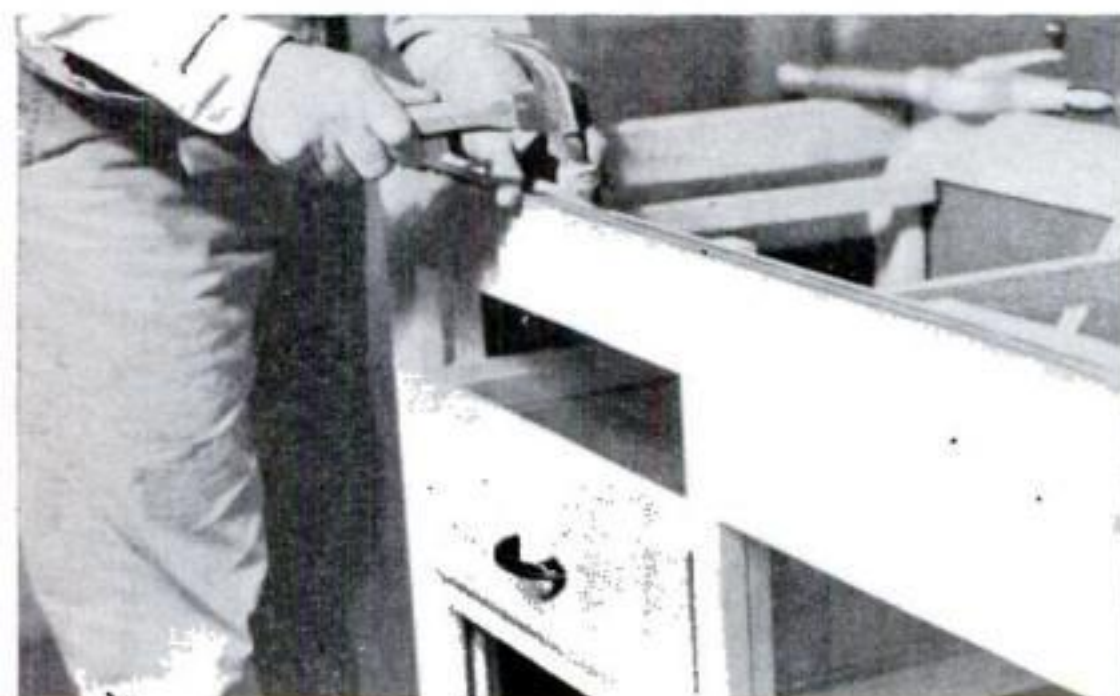


All four sides are $\frac{3}{4}$ " stock with the bottom edges rabbeted to take the $\frac{1}{4}$ " plywood bottoms. A clearance of $\frac{1}{8}$ " is provided so the drawers will slide easily.

Both the $\frac{1}{2}$ " plywood doors are $18\frac{1}{8}$ " wide. The small door is $12\frac{7}{8}$ " high and the other door is $20\frac{3}{8}$ " high. The fronts of both the doors and drawers have a $\frac{1}{4}$ " overlap all

around. Offset surface hinges were used on the doors. Inside snap catches hold them shut.

I bent the corner caps to shape from scraps of stainless steel, but factory-made ones can be bought. Paint or enamel the cabinet and attach the handles to doors and drawers to complete the job. **END**



As a decorative trim between top of cabinet and rim of sink, a strip of linoleum was tacked all along front and sides of top edge.



Completed cabinet, ready for doors to be hung, is shown above. Base was stepped back to leave 4" of toe space under front of unit.

New Furniture from Old

By Denis Sneigr

PS photos by W. W. Morris

YOU have probably found—if you've shopped for new furniture lately—that the good pieces bring high prices. Lots of times, from the standpoint of quality and your pocketbook, you can do better at a secondhand store.

Many older pieces of furniture are well constructed. The chief drawback often is the finish, which is usually in bad condition. That's where you and a little elbow grease come in. Shop carefully for the furniture you want. Be sure the piece is sound—that it doesn't have broken joints or splits in it.

Standing in a dusty corner of a second-hand shop, the small cabinet pictured here didn't look like much. It had been covered with a coat of varnish and then a coat of paint. On top of that coat, drops of paint of several different colors had been spilled. Closer examination, though, showed it was very well built of rosewood. The oak chest that's also shown was finished with varnish and had an ugly, old-fashioned look.

You'll find it easier to do the refinishing if you first remove all hardware—drawer pulls, hinges, knobs, locks. Otherwise, these are just obstructions to smooth sanding.

Then start removing the old finish with



The original oak chest, above, was coated with cheap varnish. Here old drawer pulls are being removed before starting refinishing operations. Casters also were taken off and discarded.

Refinished chest, right, sports two-tone job in green and cream enamel. Door was removed and a small radio fitted in compartment. New drawer pulls help dress up renovated oak chest.



paint or varnish remover. If possible, do this work outdoors. If done inside, be sure the room is well ventilated. Brush on the paint remover and when the old finish has blistered and wrinkled, scrape it off with a putty knife. If the old paint is tough and thick, you may have to apply two or three coats of remover to get down to the raw wood. On moldings and carvings, brush on remover and rub out the old finish with steel wool. A sharp stick is handy here, too.

When you've taken off all the old finish, wipe down all surfaces with benzene or turpentine. Most kinds of paint remover leave a waxy residue that may affect the finish.

Fill all nail and screw holes with composition wood. Now you're ready to sand the piece smooth. Use 4/0 garnet paper. After I'd removed the varnish and paint from the rosewood cabinet, I found that someone had spilled a stain on the top. The stain had penetrated the grain, and paint remover wouldn't touch it. To erase such stains, sand the wood down as far as the stain has penetrated. But sand the entire surface down evenly. If you sand only the stained spot, you'll have depression there. A belt sander does this job quickly.

Before you go on to the finish coats, remove all sanding dust with a brush or rag.

You can start to put on the new finish now. There are many finishes you can use, depending on the kind of wood. The rosewood cabinet was stained and then given several coats of paste wax, with hard polishing between coats.

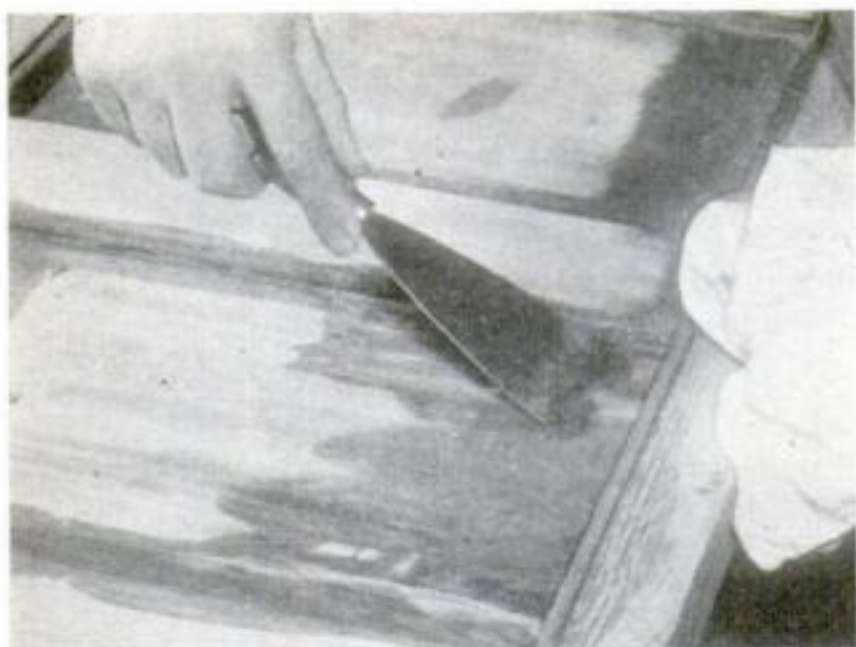
The oak chest was given a coat of flat white. This was sanded lightly when dry. Then the drawer fronts and top were coated with cream enamel. The trim, drawer separators, and sides were enameled green.

To dress up the oak chest, the door of the

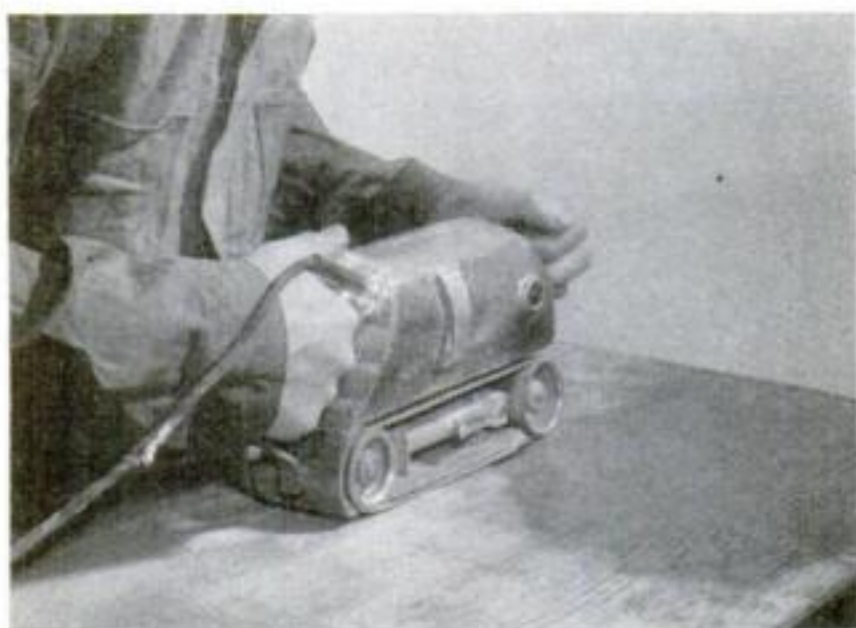


Original rosewood cabinet, above, looked like test piece from a paint factory. Besides coat of green, paints of different colors had been spilled on it. Note stained spots on door.

Refinished cabinet, left, does duty as bedside table. Shelves inside cabinet hold linens. After old finish was taken off with paint remover, cabinet was sanded and waxed.



Old finish, softened by a coat of varnish remover, was scraped from side of oak chest with a wide-bladed putty knife.



Top of cabinet was marred by stains that had penetrated grain of wood. Belt sander was used to cut down top as far as stain penetrated.



Raised wooden rings around keyholes in large drawers of oak chest were sanded down flush with fronts of drawers. Keyhole (at left) was plugged with composition wood before chest was painted. Nail holes were also plugged.

After old varnish was removed from oak chest, it was sanded smooth and given coat of flat white. Then green enamel was brushed on.



compartment was discarded and a small radio placed in the opening. A piece of wood was cut and nailed to block the opening above the radio and $\frac{1}{2}$ " quarter-round molding was used to frame the opening.

Oak can be given a natural finish—that is, a transparent finish through which you can see the grain but one that will also take a polish. Since oak is an open-grained wood, you'll have to use a paste filler to fill the pores and form a level surface for the finish coats. Fillers come in different shades. A darker filler is often used on oak to accent the grain.

Before applying the filler, brush on a coat of shellac diluted one part of shellac to five or six parts of alcohol. Follow the mixing directions on the can of paste filler. When the thin coat of shellac has dried, brush on filler with the grain. After 15 or 20 minutes, wipe off excess filler with a rough cloth or burlap. Wipe across the grain. Follow this by wiping with a soft cloth.

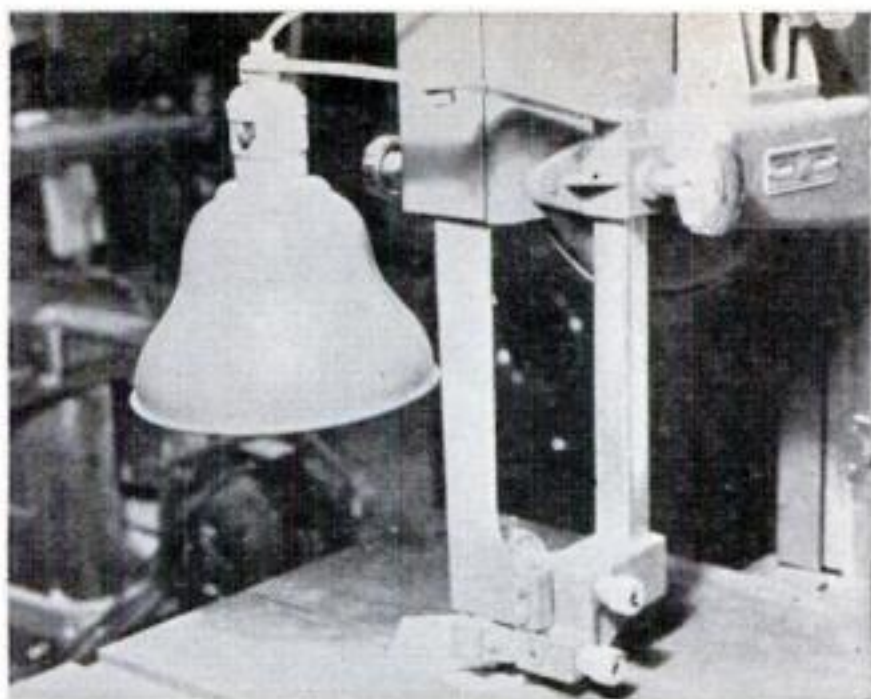
When the filler is dry, smooth it with 2/0 steel wool. Brush on two coats of shellac or brushing lacquer, sanding lightly between coats. Then put on two coats of paste wax.

The oak chest also could have been given a blond finish. First apply filler and while this is drying, mix a little color in oil with flat white paint. You can buy colors in oil at a paint store. Mix the shade you want slowly with the flat white until you get the desired effect. Brush this mixture on the furniture. After about 15 minutes wipe off all surfaces. Let the paint film that remains dry 24 hours. Rub it down with steel wool and apply two coats of brushing lacquer, using steel wool between coats. Finish with a couple of coats of paste wax.

A higher gloss could be obtained on the small cabinet by giving it two coats of brushing lacquer and then two coats of wax. **END**

Rosewood cabinet was cleaned down to raw wood. Stain was wiped on top of cabinet (below). When dry, wax was applied.





Bandsaw Light Adjusts Self

HERE'S a neat solution to the problem of raising or lowering the bandsaw light when making cuts of various thicknesses. The bracket, or supporting arm of the light, is screwed to the top of the guide bar.

When you raise the saw guide to take thicker work, the light goes up with it. Lowering the saw guide for cutting thin stock brings the light down with it. The light is always out of the way and always in the best position to illuminate the work.

For additional convenience, the light may be wired in parallel with the motor so it only burns when the saw is running.—*Herbert Pfister, The Bronx, N. Y.*

Lacquer Improves Jigsaw Job

WHEN jigsawing intricate designs in plywood, you'll get cleaner cuts if you first coat the surfaces with clear shellac and let it dry.—*A. E. Ogren, Chicago.*



Flypaper Catches Bug Bait

IF YOU'RE stuck for bugs for fishing bait, try letting the bugs trap themselves. Take along a few sheets of flypaper and lay them on the ground. Weight the corners with small stones if the day is windy. Bugs don't care where they land, and in a little while you'll find a variety of bait stuck to the paper.—*John Krill, North Lima, Ohio.*



Sprinkler Made from Beer Can

A SIMPLE soldering job will convert a large, conical-top beer can to a decorative watering pot for house plants. Near the bottom, drill a $\frac{1}{4}$ " hole in the side. Bend a piece of $\frac{1}{4}$ " o.d. copper tubing to form a spout and solder it in. Solder the $\frac{1}{16}$ " thick by $\frac{3}{8}$ " wide handle in place and enamel the can.—*William B. Eagan, Louisville, Ky.*

Sanding Small Openings

I USE a cotter pin 1" long and a $\frac{1}{2}$ " by 3" strip of sandpaper to smooth small openings. One end of the strip is wedged in the legs of the cotter pin. The rest of the strip is wound around the pin in the direction shown and the other end of the paper glued down. This makes a sanding drum about $\frac{1}{4}$ " in diameter. Then I chuck the end of the pin in my electric drill.—*William A. Novak, Maywood, Calif.*



Shop Safety with Oily Rags

IF YOU keep oily rags around your shop to wipe down machine tables and other exposed metal parts, store them in a coffee can and keep it covered when not in use to avoid a spontaneous-combustion fire.



*The ignition switch on the dash
wasn't even turned on, yet the engine
of Ted's jeep was running fine.*



Gus and the

**A secret project at the Model
Garage gets the local National
Guard unit into deep water.**

CURIOSITY being what it is, a good many of the Model Garage's regular customers wondered what was going on one morning a few weeks ago. Gus Wilson, its well-known owner, had screened off one corner of his repair shop by stringing an old truck tarpaulin from the



Miracle Jeep

By Martin Bunn

ceiling. Then he had added to the mystery by hanging a large sign on the tarpaulin—KEEP OUT.

To anyone who asked him about it, Gus replied with a pleasant smile and a polite change of subject. As a result, speculation as to what was going on behind the curtain ran wild—including one rumor that Gus was working on a top-secret invention for the Government.

Even Stan Hicks, Gus's helper, was completely in the dark. Gus would tell

him nothing. All that Stan knew was that Ted Stevens, who'd served in the Army during the war and who was active in our town's National Guard unit, had driven an Army jeep into the shop late Saturday night and had gone into a long whispered huddle with Gus. When Stan showed up for work the next morning, the curtain was up, and, ever since, Gus and Ted had been spending a good deal of time behind it. Stan guessed that the jeep was behind the curtain too; he'd



heard an engine running once or twice.

"What gives?" Stan finally asked when Gus emerged from his curtained corner for lunch on Tuesday. "Why all the mystery? Can't you even let an employee in on the big secret?"

"There's no big secret," Gus grinned. "Haven't you heard that the National Guard units in this area are holding their annual training encampment over at Danesville starting this week end? Well, I'm just helping Ted Stevens get his unit's jeep in shape for the maneuvers."

Stan knew Gus Wilson well enough to know there wasn't much use asking more questions, so he let it go at that.

Curtain and Jeep Disappear

On Wednesday morning, the "iron curtain," as Stan jokingly had got to calling it, was gone. So were Ted and the jeep. They had disappeared as quickly and mysteriously as they had appeared.

Stan had pretty much forgotten the whole thing when, about 10 days later, Gus made a suggestion:

"How about driving over to Danesville with me this morning, Stan? Understand the Guard is putting on quite a show, and I think we ought to see it."

Make Trouble Pay

Had any interesting car breakdowns lately? Gus wants to hear about your tough and tantalizing automotive problems. Write him about the false diagnoses as well as the cures. Popular Science will pay \$25 to the first sender of each usable story idea. Letters can't be acknowledged or returned. Address: Martin Bunn, Popular Science, 353 Fourth Avenue, New York 10, N. Y.

"But what about all this work that's stacked up?" put in Stan.

"It'll keep," Gus assured him. "Besides, it'll do Joe Clarke good to get his nose out of those books and hold down the fort for a few hours. Wipe that smudge of grease off your nose and let's get going."

"Okay, boss, if you say so," Stan agreed as he clambered into Gus's car. Watching the boys in khaki put on a sham battle might be fun—anyway, it was better than greasing cars on a nice summer morning.

When they drove into the Danesville camp, hundreds of visitors from the nearby towns already were wandering over the reservation. The show turned out to be a series of scattered demonstrations, with signs directing visitors to go from one to another. At one spot, several squads of guardsmen were building road blocks and tank traps. Close by, others were demonstrating chemical-warfare tactics. At a third, a crew was simulating the firing of a World War II antiaircraft gun. Stan really began to get interested.

Gus Leads The Way

Gus, however, paid little attention to anything until he spied a sign that read, "Vehicle Waterproofing Competition." An arrow pointed down a hill that led to the shore of a fair-sized lake that was part of the camp.

"This is us," he said as he led the way.

When they reached the lake, Stan saw five Army cars, their engines running, lined up on the pebbled beach. There were three jeeps, a carryall, and a scout car. Gus and Stan found a spot on the hillside where they could get a good view. They had just about settled themselves on a couple of rocks when a loudspeaker boomed forth:

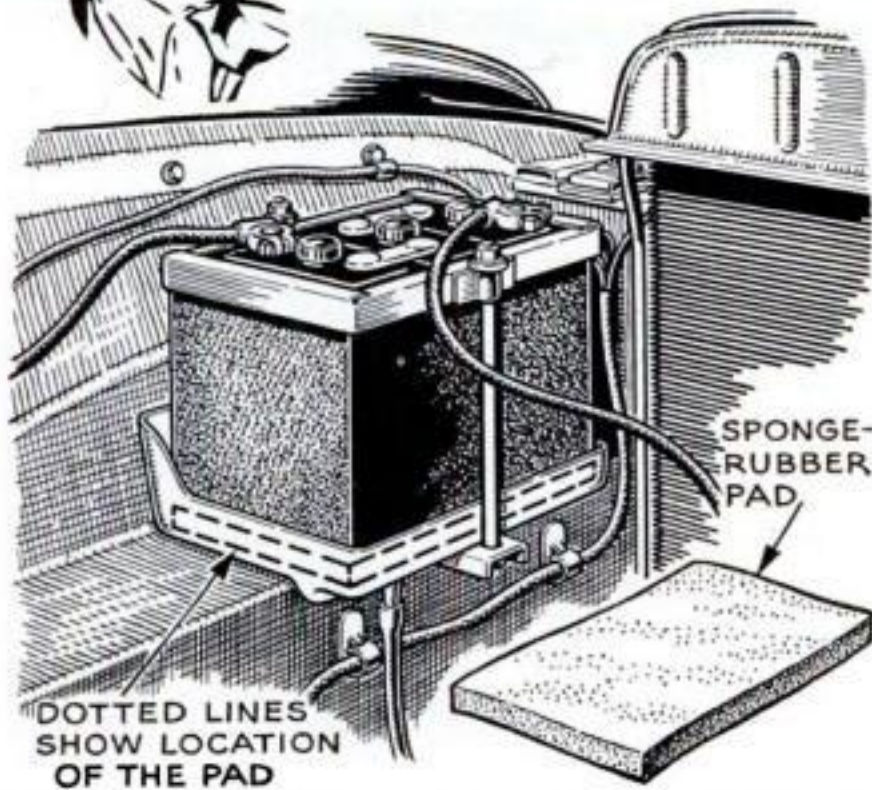
"Ladies and gentlemen. You are about to witness a unique exhibition and contest. Each of the five National Guard units taking part in this two-week training program has been asked to enter one Army vehicle in this competition. Each unit has prepared their vehicle for underwater operation. This procedure was common practice in landing operations during the last war . . ."

Then the voice went on to explain that on signal the drivers, wearing bathing shorts, would drive their cars into the water until they were fully submerged, except for the drivers' heads and the extended exhaust, air-intake, and gas-tank-vent stacks, and would

[Continued on page 218]



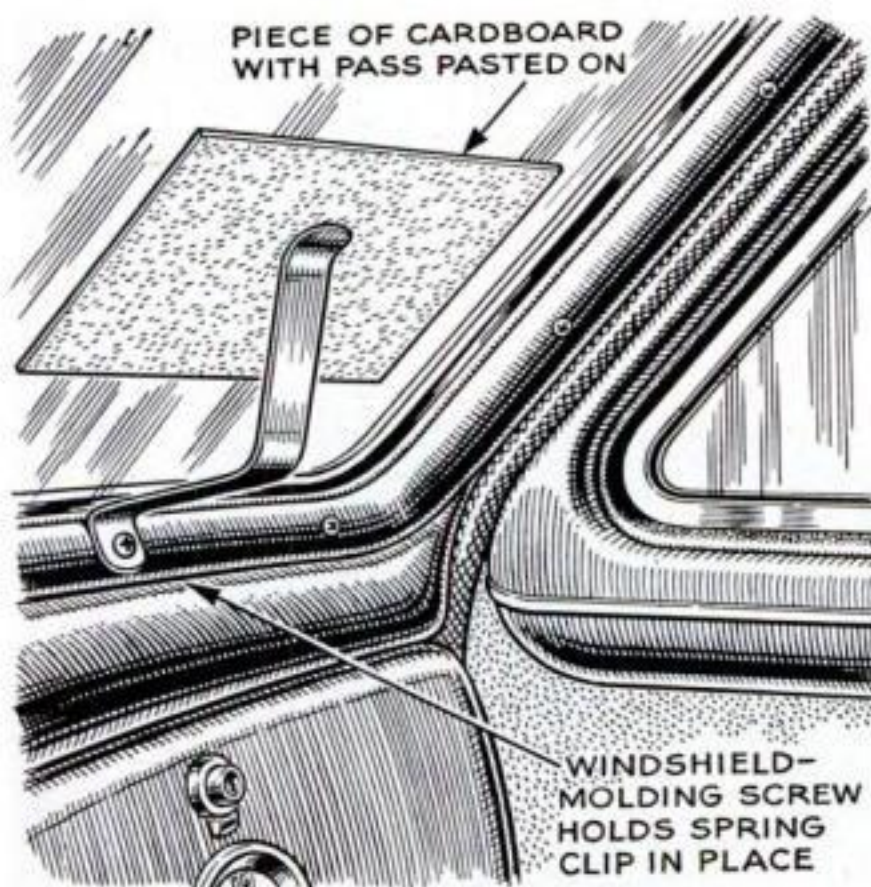
Hints from the Model Garage



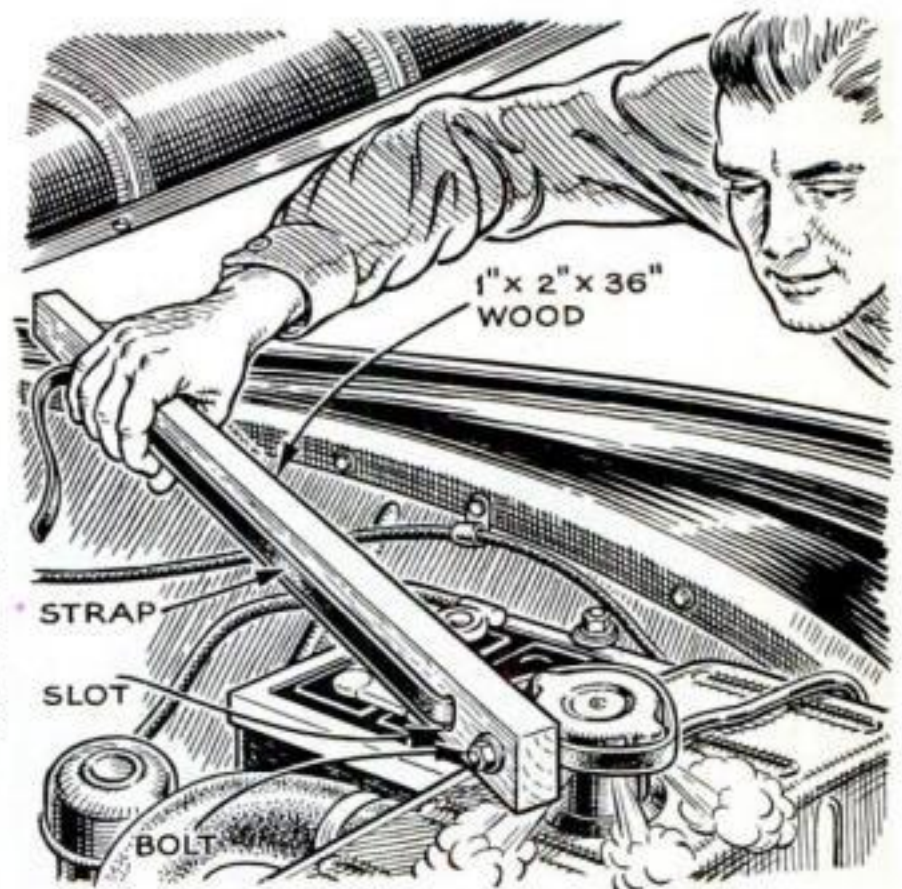
Pad Lengthens Battery Life. A rubber pad placed under a battery will protect it from jolts and jars on rough roads. Even if the hold-downs should loosen, the rubber pad will keep the battery from being damaged by the jouncing.



Bent Wrench Fits Tight Spot. Richard D. Briggs, of Spencerville, Ohio, reports that a wrench like this is one of his most useful tools for working in narrow quarters. To be bent this way, the wrench must be the stamped kind.

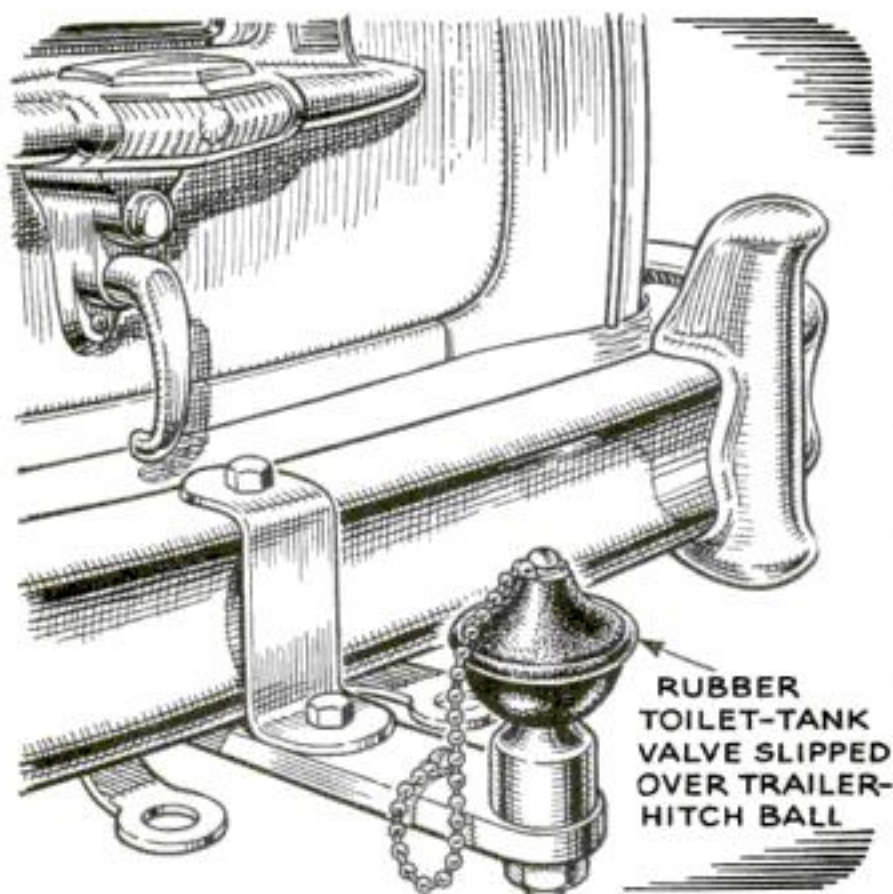


Clip Keeps Pass in Place. If you must display a window sticker or card of a temporary nature, for instance a parking pass at a factory or beach, an easily made clip will permit quick placing and removal. Cut the clip from springy sheet metal and paint it to suit the car. Attach it by one of the windshield-molding screws.

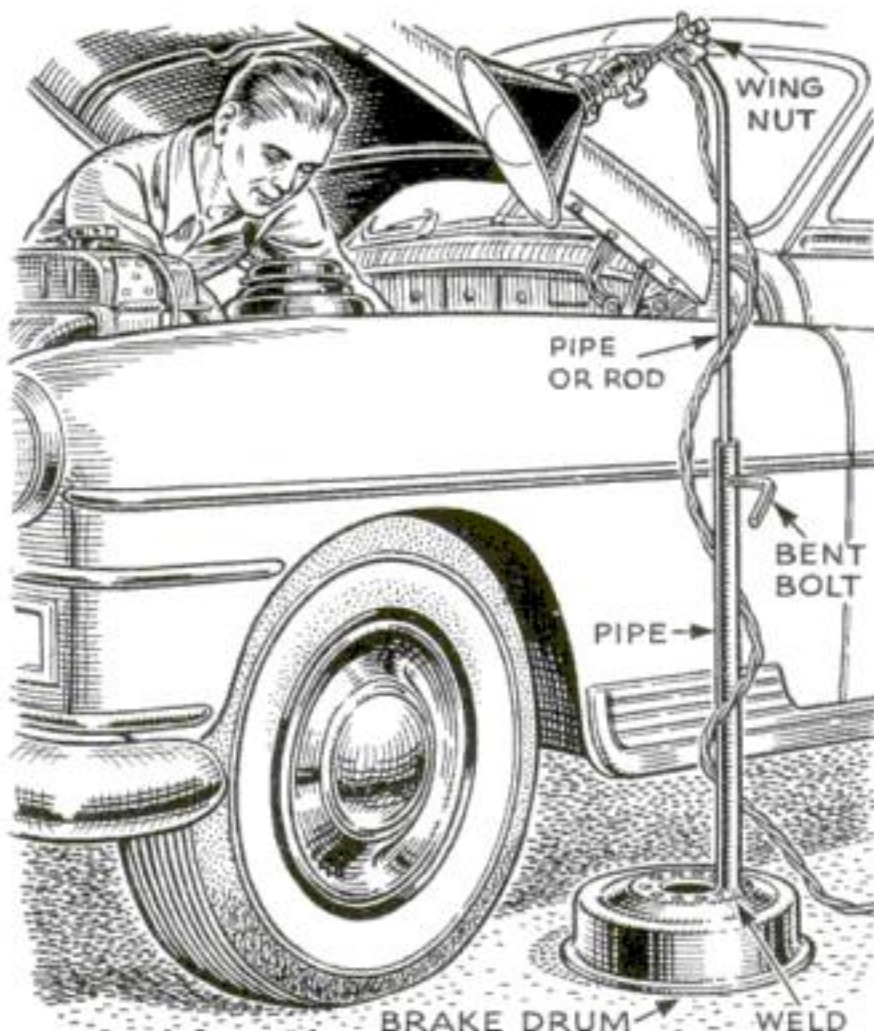


Removing Hot Radiator Caps. If a car is steaming, this job can sometimes lead to nasty burns. For his own protection, Marion L. Rhodes, of Knightstown, Ind., rigged up the tool shown above. The leather strap is looped around the cap and pulled snug. The long handle puts the mechanic a safe distance away from the steam.

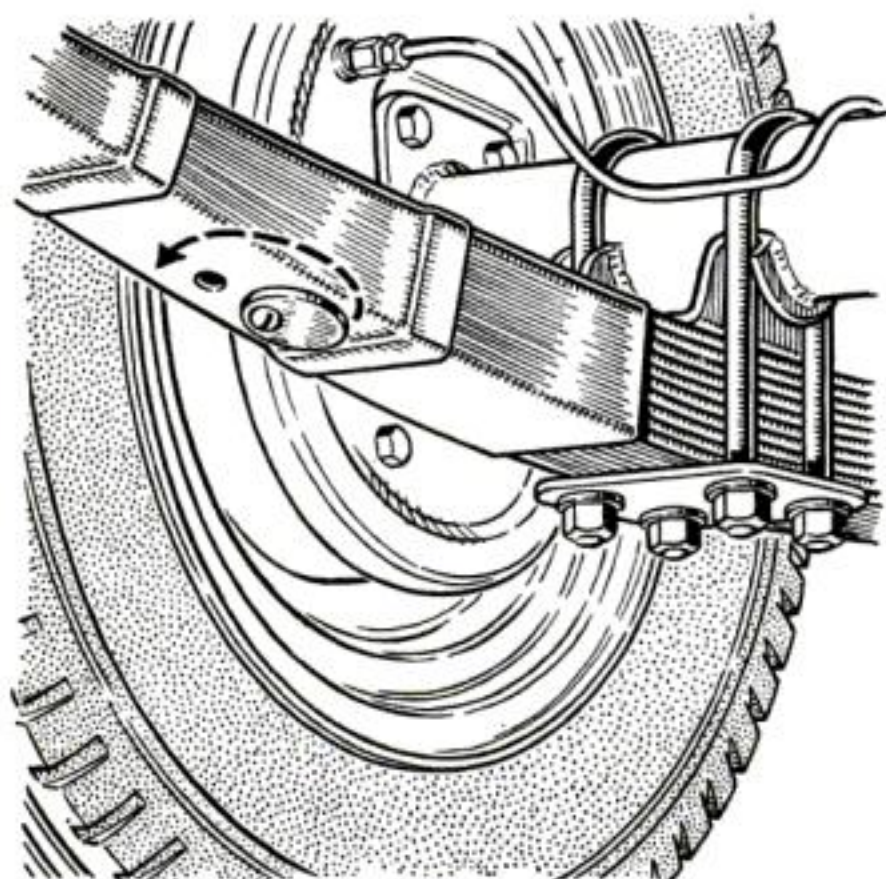
MORE Hints from the Model Garage



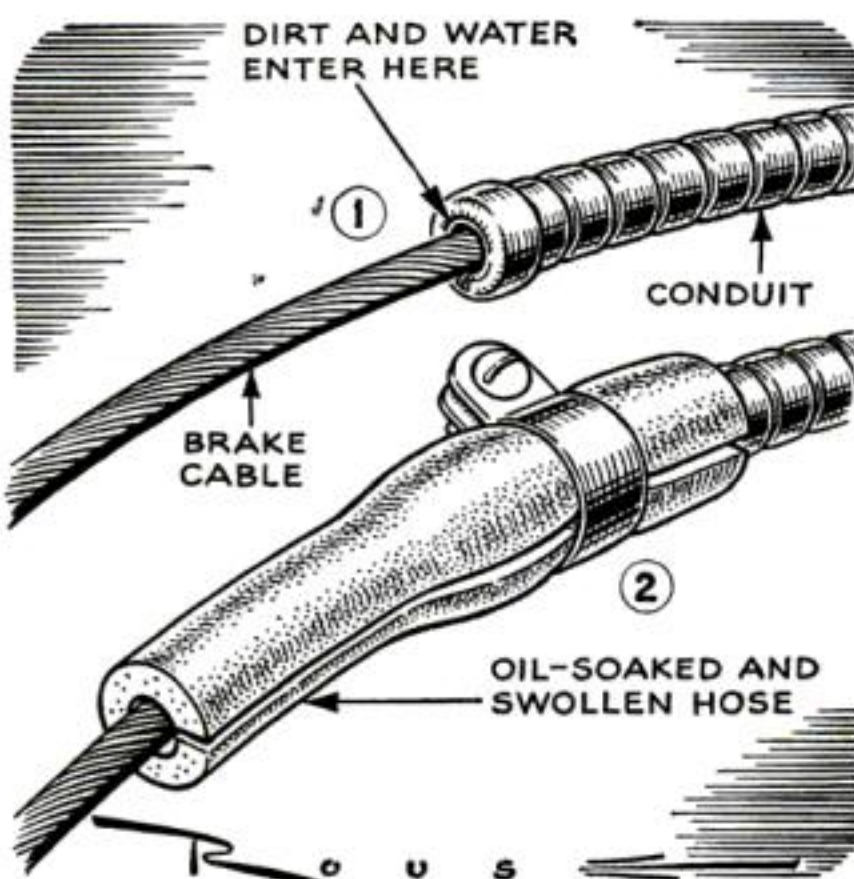
Protecting Hitch Ball. Wallace Genthner, of Troy, N. Y., has found that a rubber toilet-tank valve provides a good way of protecting the trailer-hitch ball on his car. A light chain attaches the ball to the bumper of the car.



Old Parts Make Shop Lamp. Using scrap parts found in any garage, you can quickly make a shop lamp like this one, built in Wilmer D. Crago's shop at Red House, W. Va. The bent bolt in the pipe lets you adjust the height easily.



Disk Covers Spring Oil Hole. If your car has metal spring covers, a metal disk attached as above will keep grease from oozing out after lubrication. Cut the disk the size of a half dollar. Fasten it with a metal screw. Turn the screw tight to keep it over the hole, and loosen it before greasing the springs.



Cover Protects Brake Cable. On the older Fords, dirty and sticking parking-brake cables sometimes give trouble. As in the top sketch (1), dirt and water in the conduit may interfere with brake release. To prevent this, split a piece of rubber tubing and clamp it to the conduit (2). Soak it with oil to lubricate the cable.

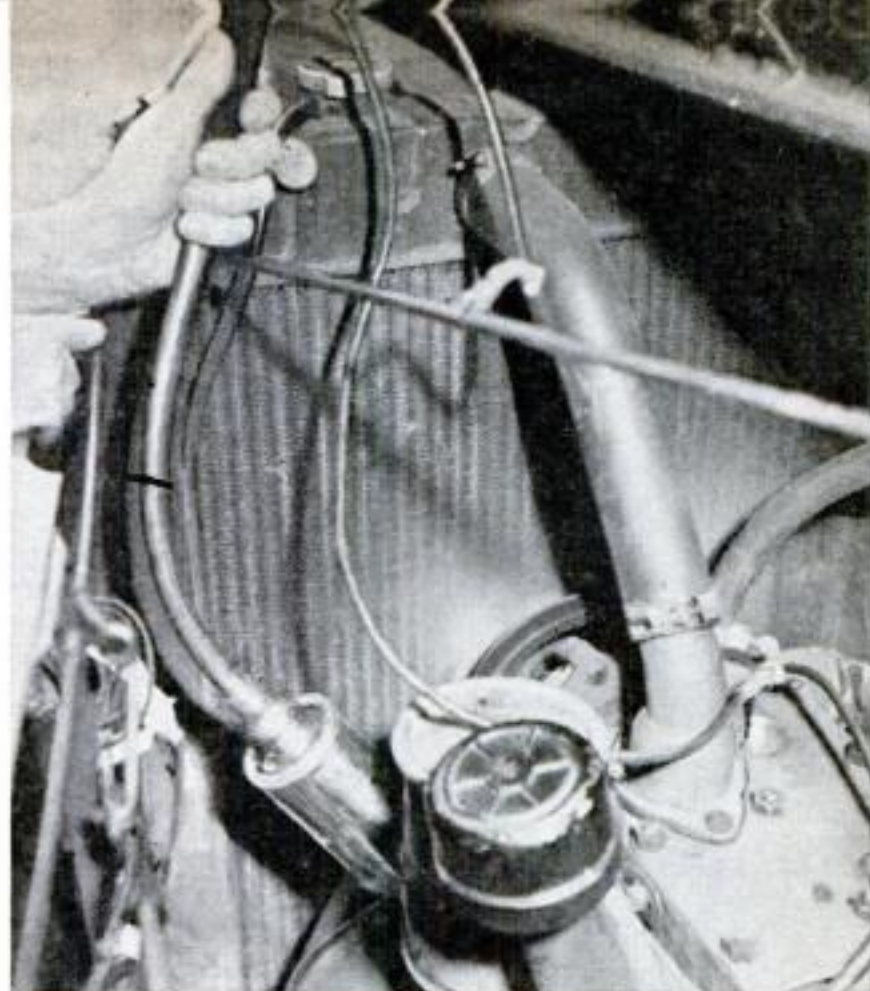
An Ignition Timing Light for a Dollar

AN ORDINARY neon glow lamp can be turned into a timing light that will let you adjust your car's ignition with great precision. It won't be as bright or as fancy as the kind garages use; but it won't cost ten or fifteen bucks. You should be able to make it in half an hour for less than \$1.

Suitable glow lamps, obtainable in electrical and radio supply houses, are the NE-40 and the NE-42. Both are three-watt lamps, the former fitting a standard household socket, the latter a double-contact, bayonet-type auto socket. If you use the NE-40, you'll get the most light by connecting it so the outer electrode is the one that flashes.

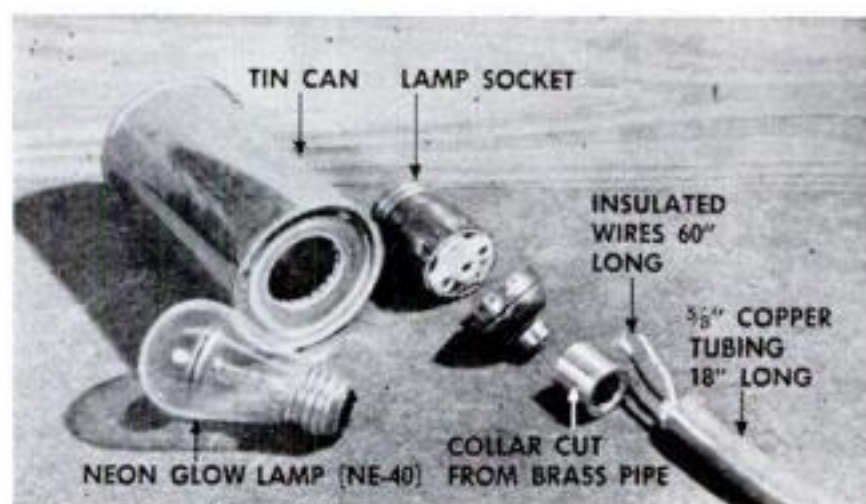
Rig up a small can as a reflector shield. A copper-tubing handle lets you spot the lamp close to the timing marks without getting your hands too close. Use heavy insulation; spark-plug voltages can bite.

Finish off the leads in alligator clips. One

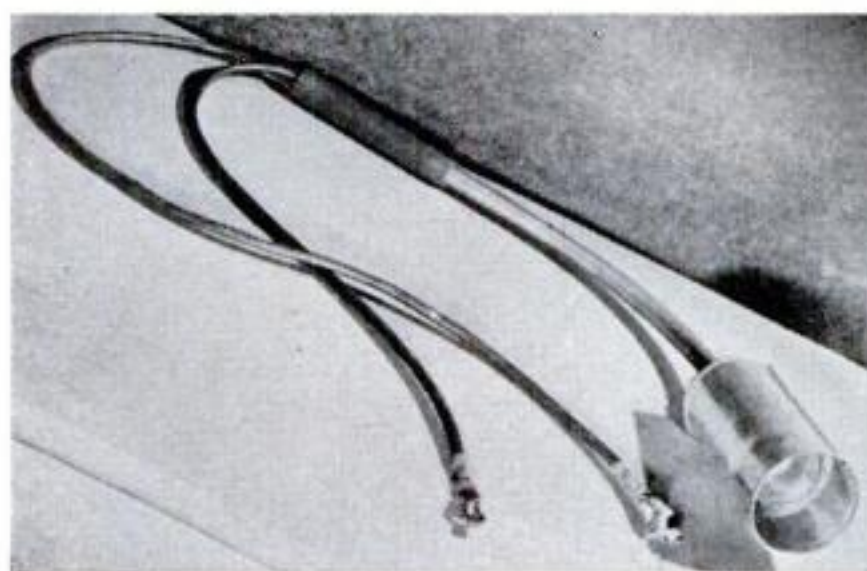
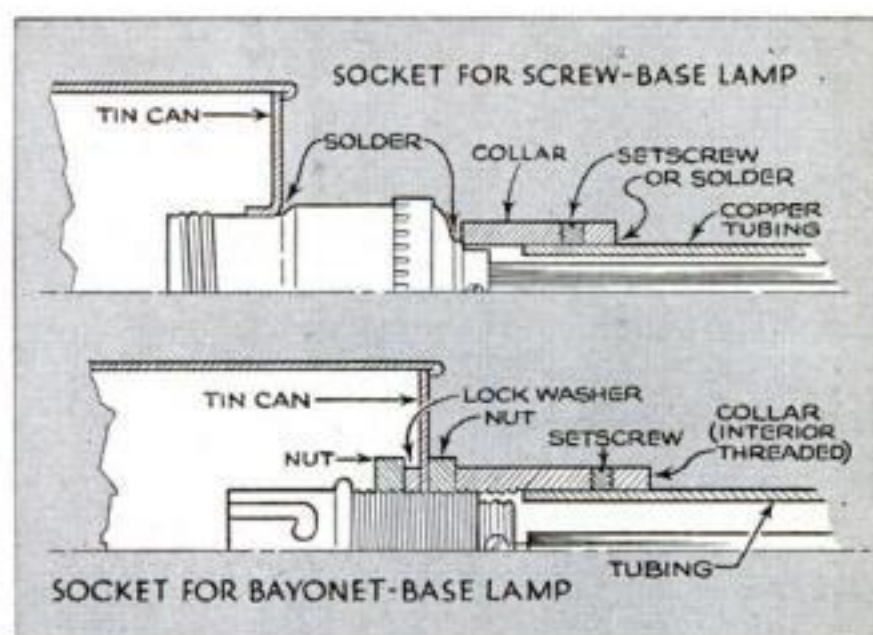


goes to the No. 1 plug and the other to ground on the engine. For visibility, rub chalk on the timing marks, which may be on the flywheel, harmonic balancer, or lower fan-belt pulley, depending on the engine.

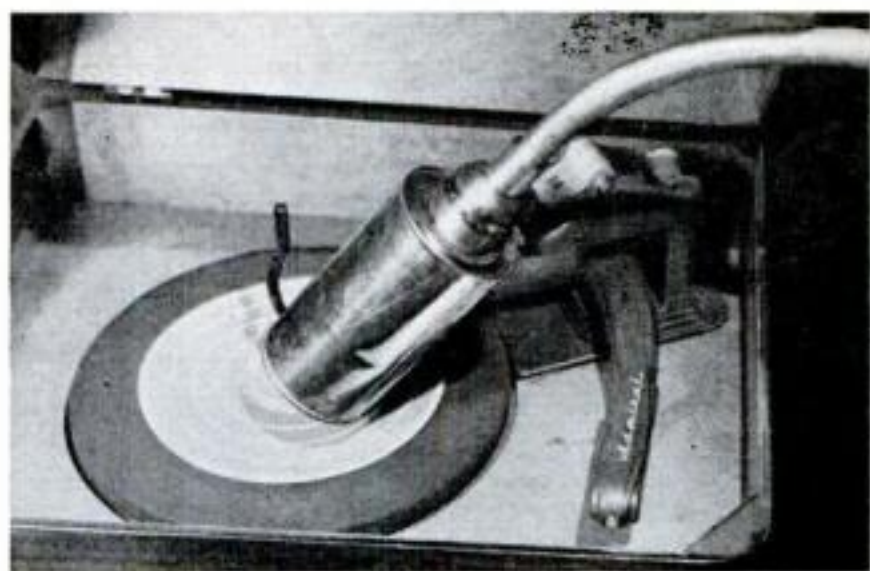
The NE-40 lamp has a built-in resistor that lets you also use it on a 115-volt line for such other jobs as checking phono speeds. The NE-42 doesn't have one. **END**



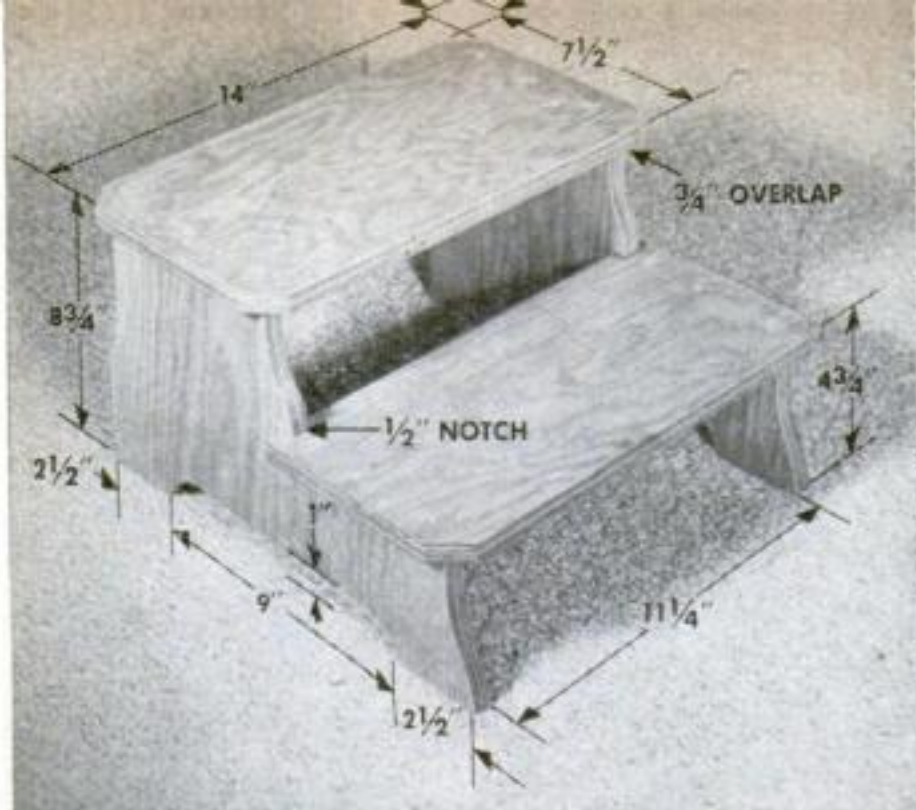
Parts required. Pick a can of small diameter so it'll fit in tight engine spaces. Sketch at right shows how to mount two types of lamps.



Finished lamp. Solder battery clips to wires and insulate the handle with piece of garden hose or by wrapping with electrician's tape.



Light has other uses. For instance, with a stroboscopic disk it will enable you to regulate a phonograph turntable as shown above.



Lightweight Stool Won't Tip Over or Wobble

YOU'LL find lots of uses in your home for this sturdy stool.

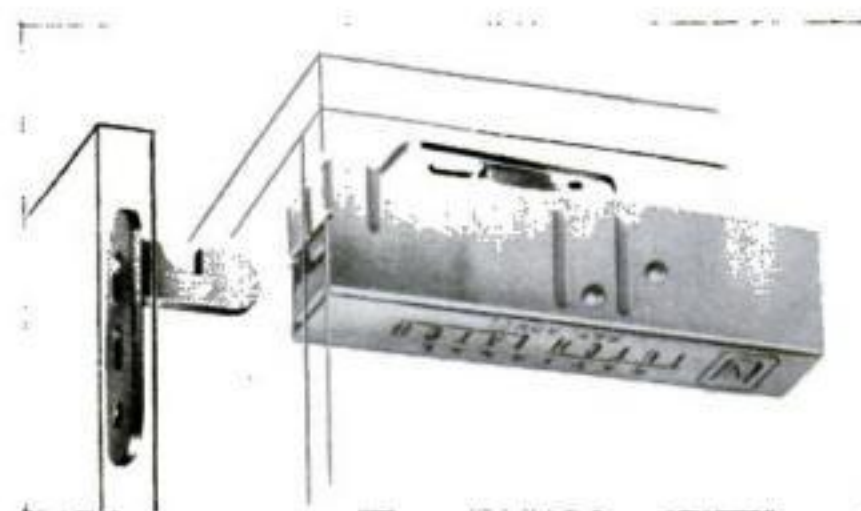
All parts are cut from 3/8" plywood. Dimensions are on the photo. You can suit yourself about the curves on the edges of the two vertical supports, but cut them so the front feet project 1/2" beyond the front edge of the lower step. Cut the step plates to size and bevel the corners. Notch the lower step to fit into the two supports. Sand



all pieces thoroughly and assemble with finishing nails, countersunk and plugged over with composition wood. Finish with shellac or varnish. Or, if you prefer a color, give the stool a coat of flat white and then a coat of enamel. As an added touch, linoleum or rubber may be cemented to the steps.—*Roland Cueva, Newport Beach, Calif.*

Touch Opens Cabinet Latch

THIS latch—made by the National Lock Co., of Rockford, Ill.—is invisible from outside the cabinet. No knobs or pulls are necessary. The latch holds the door shut but when you touch the door, the latch releases and the door springs slightly ajar. It is installed with the strike on the door and the latch is screwed inside the cabinet—under a shelf or on the side of the cabinet.



Caliper Made of Plastic

PICTURED below is the first caliper to be made of plastic, according to the Plastic Measuring Tool Co., of New York City. Retail price is \$1.29. The maker says the instrument is as accurate as a steel one. It has a tolerance of .002". The metal rod measures depths. Inside, outside, and step measurements also can be taken.



Valve Fits in Hose Line

LAWN sprinklers are easy to adjust with this valve (pictured below) in the hose line. Placed just out of sprinkler range, you can accurately control the spray—even if you can't see the sprinkler from the faucet at the house. Turning the knurled center section operates the valve. Such a valve was suggested in *I'd Like to See Them Make* (PS, May '50, p. 234). It's priced at \$3.50 by Jetro, Inc., of Bay City, Mich.





Weigh anchor and set sail for a neatly trimmed lawn. The mower shoves itself—you just go along for the stroll. In five minutes the air-cooled motor can be taken off and the propeller unit attached to convert the power plant back into an outboard.

We Mow Our Lawn with an Outboard

By H. W. Bull

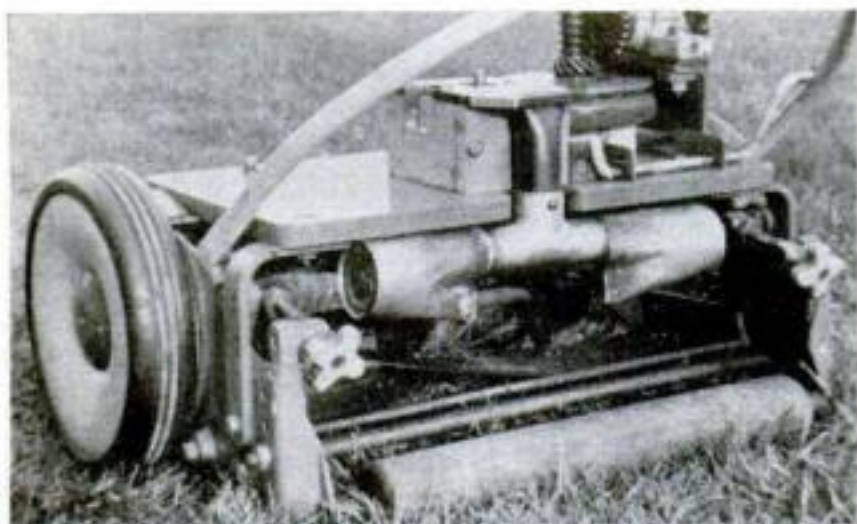
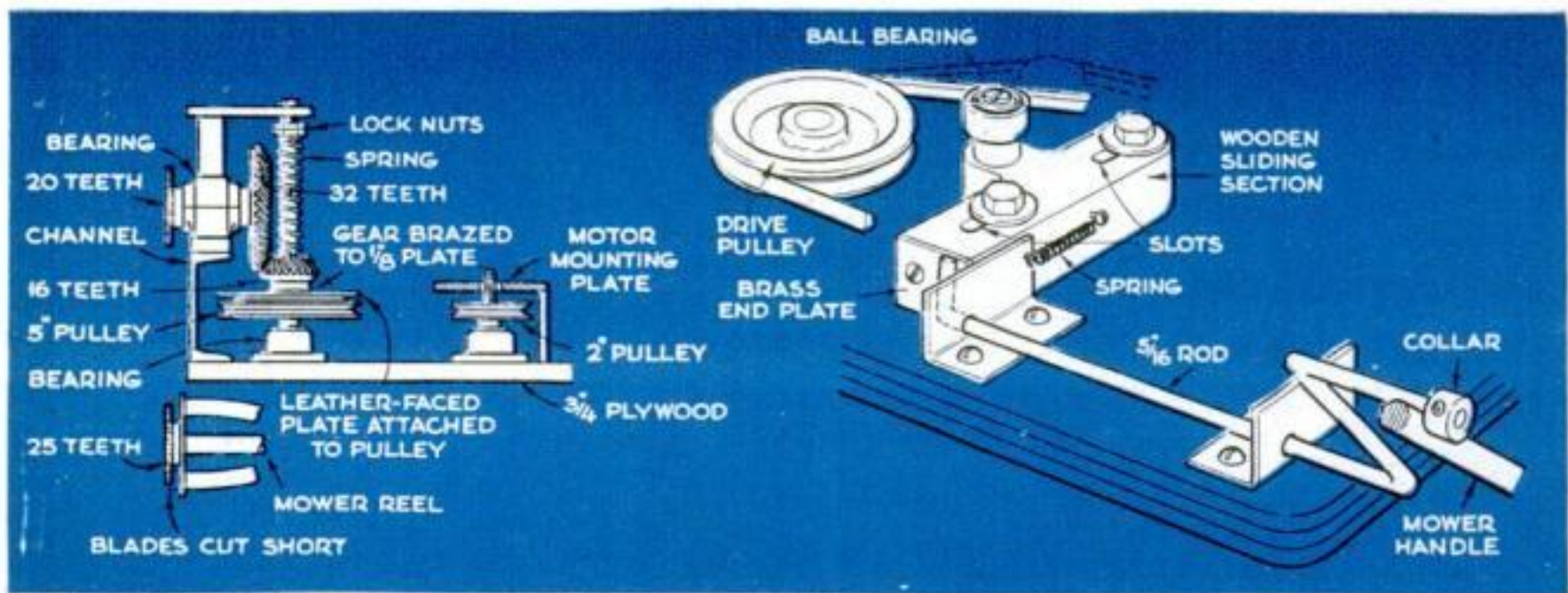
WHAT can you do if you want a small outboard motor *and* a power lawn mower—and can't afford both? Stymied by the budget, it looked as though we'd have to wait for one or the other.

Instead, we bought a little air-cooled outboard for less than \$60 and a 17" muscle-pushed lawn mower for \$30. We rigged the motor so that it drives the mower but can be detached for boat use. Now we have happy sailing on the water and on the lawn.

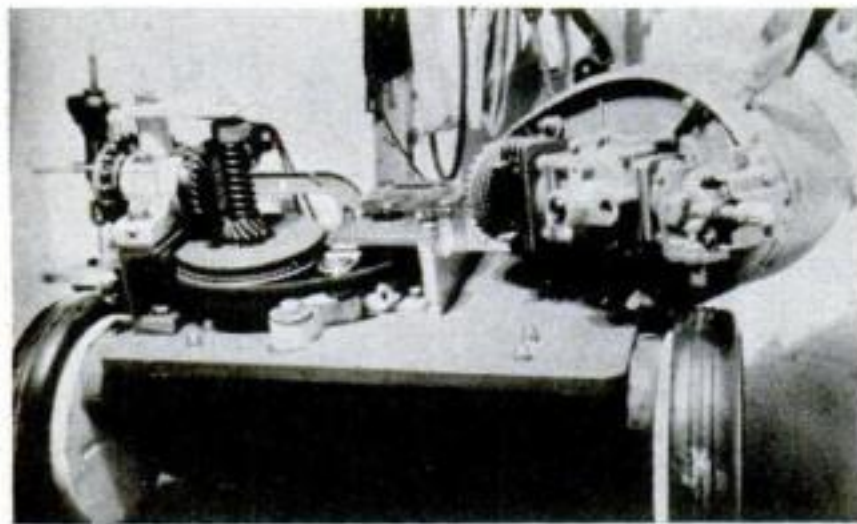
Our 1½-hp. outboard can be separated from its propeller unit by unscrewing four bolts. Then we attach it to a matching steel plate on the mower. The exhaust



Sheet-metal guard covers the chain. A crank, lifted by raising mower handle, tightens the V belt to engage drive. Crank is slid off sideways for storing mower with handle up.



Homemade muffler consists of T pipe perforated at ends. Frozen-orange-juice cans bolted to pipe have open ends facing inward. These are squeezed at bottoms to form narrow slots.



Motor slips onto a splined shaft in mounting plate. A ball bearing mounted on a slotted wooden bracket tightens the belt as mower handle is raised to walking position.

Pipe Protects Gate Lock

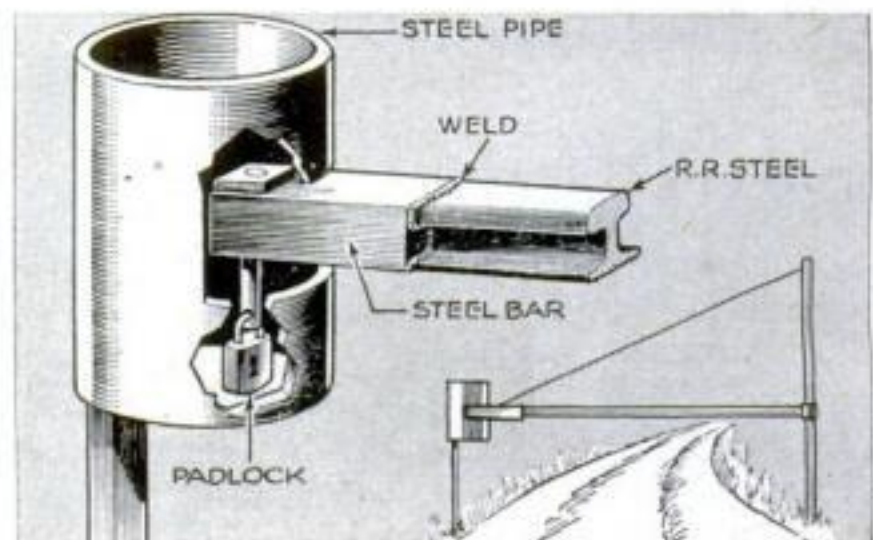
A LENGTH of steel pipe protects the padlock of the gate at right from trespassers. A hole was cut about one-quarter around the pipe to take a 2" by 4" steel bar that was welded to the railroad-iron gate. The steel bar was drilled for the pin and the pin was drilled for the lock. With the lock in place, it's very difficult for anyone to reach the lock with a file or hacksaw, and yet it can easily be unlocked with a key.

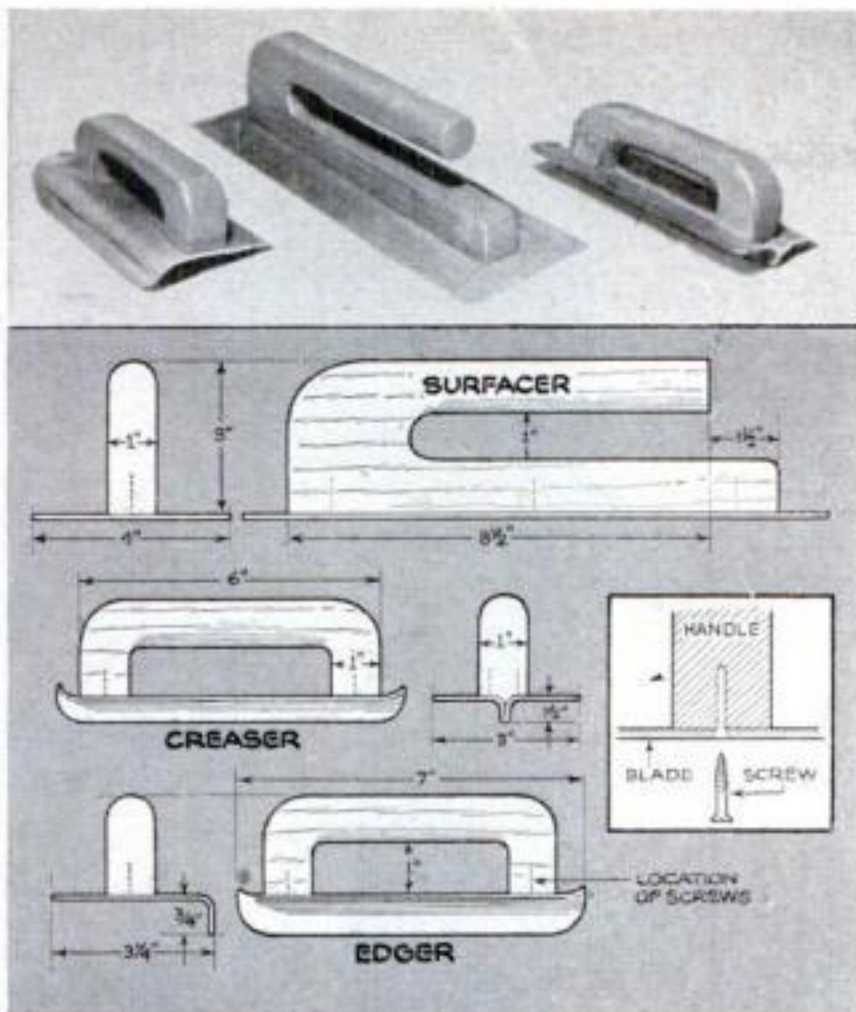
lines up with a section of pipe welded to the plate and leading to a T muffler under the plywood platform. The engine itself weighs only 13 lb., and the switch is easy to make. It takes only five minutes.

A splined shaft with a 2" V pulley runs through the mounting plate to engage the motor shaft. The V belt drives a 5" pulley and, through a leather-faced clutch and a pair of bevel gears, a sprocket from which there's a chain drive to another sprocket on the mower reel. The gear, clutch plate, and pulley all rotate freely on a stationary spindle set into a bearing socket below and held in a bracket above. A spring pushes the clutch faces together.

Slippage in the clutch protects the motor from shock damage if something jams the blades. Operating clutch control is by an idler pulley that normally leaves the belt slack until the mower handle is raised to walking position, when a lever moves the idler to tighten the drive belt.

The motor turns the reel, and the reel turns the wheels through the original pinions inside. At 2,500 engine r.p.m., the mower moves at a reasonable walking speed. Should it get away from the operator, the handle will drop and disengage the idler, cutting off the power. **END**



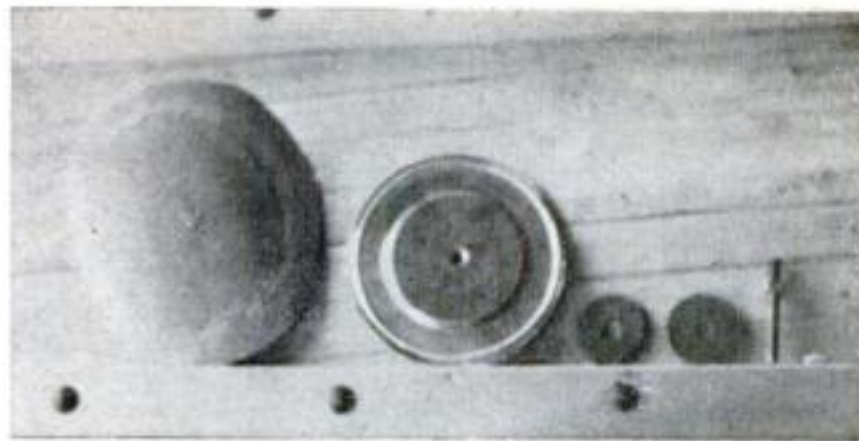
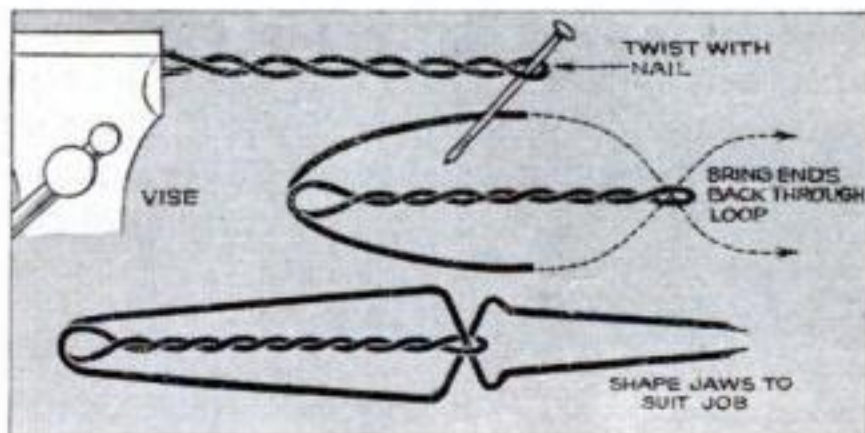


3 Concrete Tools for 20 Cents

AN AMATEUR'S concrete work often looks bad because he lacks the proper tools. I made my own three finishing tools—surfacers, edgers, and creasers—with 20 cents worth of material. I bought 4" wide scraps of 20-gauge-steel, which had clean edges cut on a big shear. All dimensions and shapes are shown on the drawings. Screw holes in the blades were countersunk so that the heads of the screws used to attach the hardwood handles would fit flush.—*Harold Jackson, Kankakee, Ill.*

Make Your Own Tweezers

JEWELERS and modelmakers will find spring tweezers handy for gluing or soldering small parts. Make them by gripping a loop of spring brass or steel wire in a vise and twisting it with a large nail. Then bring the ends back through the loop to form the jaws of the tweezers, as shown below. The jaws may be flattened, bent at right angles, or looped to suit the job at hand.—*John Burroughs, Tacoma, Wash.*



Power Sander Made Quickly

A SANDER suitable for small jobs on curved surfaces can be made in a jiffy with the parts above. Attach a large disk of garnet paper to a 3/4" electric drill. Cut the head off a 1/4" bolt so that it will fit in the drill chuck. Then place the sandpaper and the top of a coffee can, or some similar lid, on the bolt between nuts and washers. The rim of the sandpaper projecting beyond the lid will bend for work on curved surfaces, but will not tear or crumple if handled carefully. Center the lid and paper accurately.—*E. V. Reyner, Townsend, Mont.*

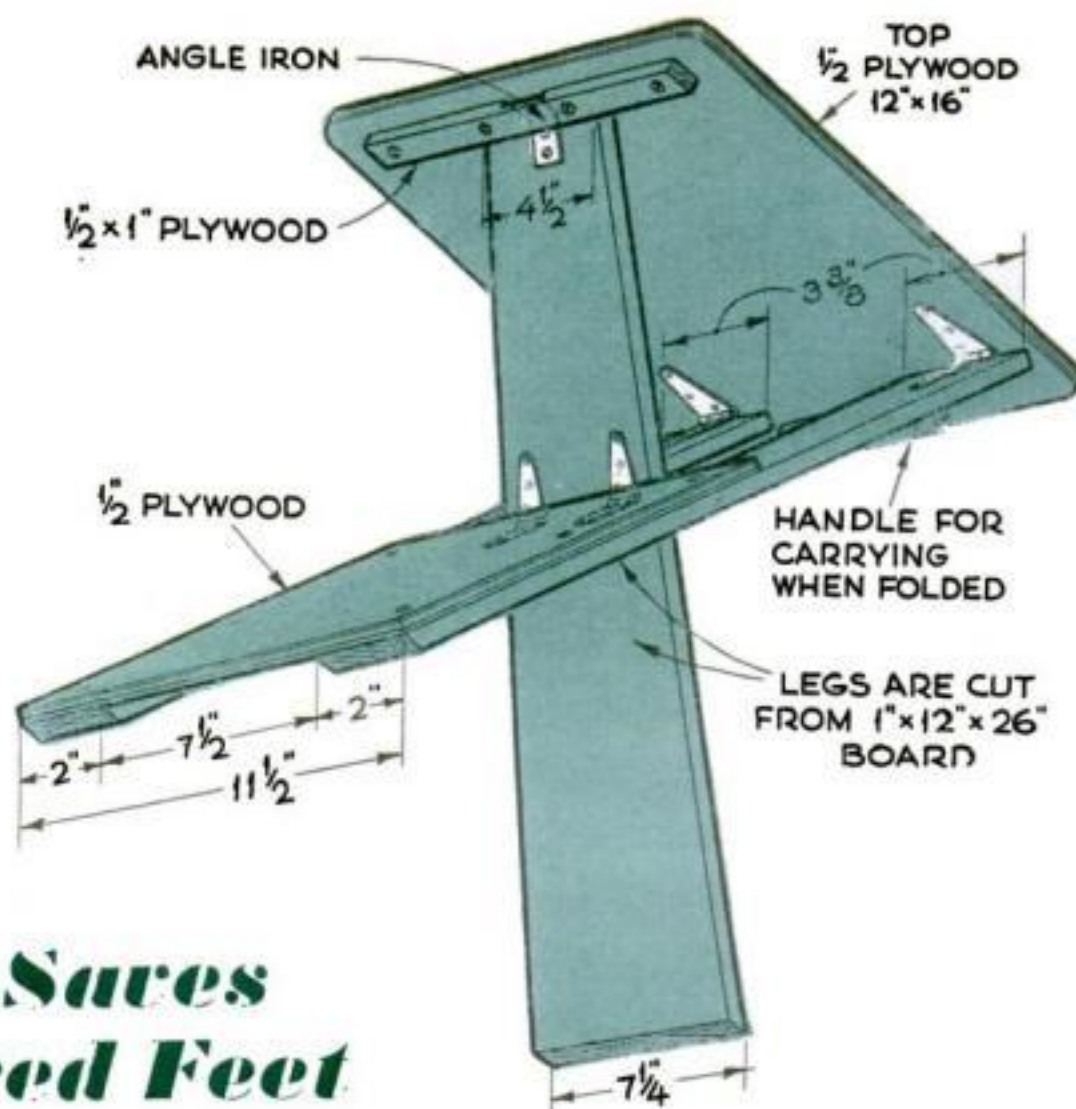


Rod Rolls-On Building Paper

A ROD like this is as good as an extra pair of hands when you put up building paper. Serving as a spool for the roll, it keeps the wind from tearing or wrinkling the paper, and helps you keep it straight.

The rod can be a 12' length of 1" by 1 1/2" lumber, with a 10" crosspiece of the same material fastened to it with a single nail to support the roll of paper at whatever point you want it. A spike driven in at an angle through the long member about 2" from the top will serve as a hook to hang the assembly from the rafters plate or the eave. By lifting the hook clear from the plate and unrolling the paper a few inches at a time as you need it (see photo), you can easily keep the paper under control.—*D. W. R. McKinley, Ottawa, Canada.*



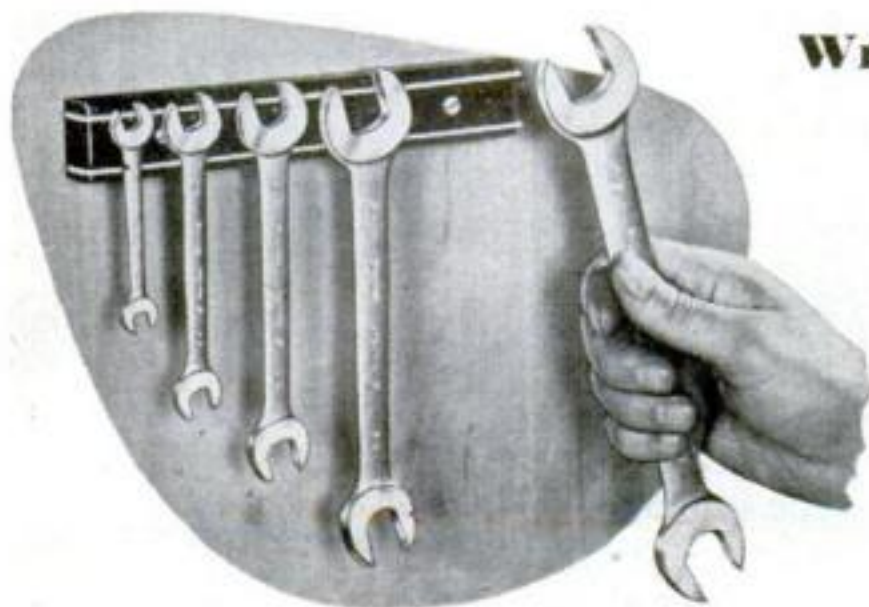


Folding Stool Saves Space and Tired Feet

SPACE SAVERS are always in demand in small kitchens. The stool shown here fills the bill. It's designed for use at worktables 36" high and it folds flat for storage between the wall and refrigerator or in any other narrow space. If you want to adapt it to a 30" table, just make the legs shorter.

You'll find the stool both easy and inexpensive to build. The legs are cut from one piece of 1" by 12" by 26" stock. By making two diagonal cuts, all three legs are formed. One-inch solid stock can be substituted for the $\frac{1}{2}$ " plywood seat if the seat is strengthened by heavier crosspieces.

Two pairs of 3" strap hinges, a 2" angle bracket, and a few screws supply all the needed hardware. The cleats and leg-spacing panel are glued and screwed. Cut the angle bracket to lock under one cleat.—*Robert Hoppough, Encino, Calif.*



Wrench Sets Have Magnetic Holder

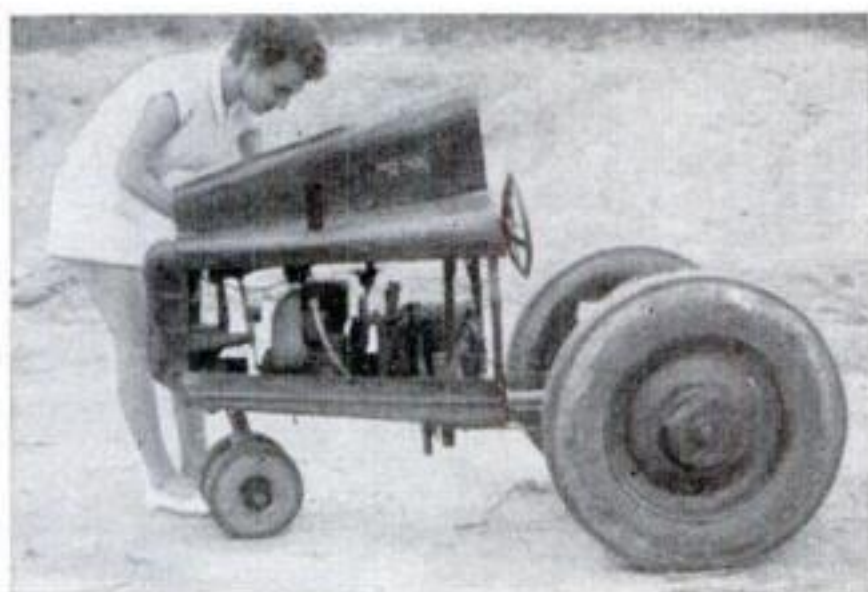
FEATURE of this wrench set is the 8" permanent-magnet holder that is easily screwed to a wall, workbench, or tool chest. The manufacturer, the Billings and Spencer Company, of Hartford, Conn., supplies chromium-plated wood screws for mounting the holder. The wrench sets are available in open-end and combination patterns. Open-end sizes (pictured at left) range from $\frac{1}{4}$ " to $\frac{3}{8}$ ". The combination pattern sizes run from $\frac{7}{16}$ " to $\frac{3}{4}$ ".

Built by PS Readers



Twins in Family. The Krieg brothers, of Coeur d'Alene, Idaho, found that their No. 7 midget car was so popular with the youngsters they built No. 9 to give it some competition. The two cars are similar in everything but details. A $\frac{3}{4}$ -hp. rear-mounted

engine is V-belted to a countershaft that has a positive-drive clutch, and a chain from the countershaft drives the right rear wheel. Steering gear is revamped from Model-T Ford parts. Each car is about 5½ feet long, and weighs 135 pounds.



Toy Tractor No Toy. Though he built it for his young son, Thomas McKenzie, of Pinehurst, N. C., has found many grown-up uses for this little tractor. He says that it has the pull of a mule, and he's often put it to work hauling topsoil, wood, and coal, as well as for plowing the garden.

Parts from at least four cars went into the tractor. There's a little bit of Chevrolet, Ford (Models T and A), and Dodge between the wheels. The engine's from a motor scooter. Some of the tractor's features are separate rear-wheel brakes (an aid in turning), three-speed transmission, kick starter, hand throttle, and an auto-type clutch. Top road speed is 10 m.p.h.

Versatile Two-Wheeler. A power take-off makes this homemade tractor a particular handy implement to have around. The 1-hp. air-cooled motor is located up in the open so that its drive shaft can easily be linked to a rotary snowplow, circular saw, or other machine. John W. Foss, of Los Angeles, built the tractor and uses it for plowing, harrowing, and cultivating.



Pedals Paddle. This craft gives Dolores Dein, of Farmingdale, N. Y., a strictly unusual ride. Her father, William Dein, built this water bike from some surplus wing floats and an old bicycle frame. The floats and platform are joined by a steel frame. Bike pedals linked to boat paddles drive the light, high-riding craft.



How we replaced a jumble of cabinets with a planned combination that gives us home entertainment at its best.

By Richard E. Prentice

PS photos by W. W. Morris

We Built a Family Theater in Our Living Room



A HOME-THEATER corner has turned our parlor into a place with built-in entertainment for the whole family. We've combined the best in radio, television, and record-playing units in an arrangement that makes them all look as if they belonged. And best of all, we got rid of the rabbit warren of tangled wires and unmatched cabinets and boxes that had been cluttering up the room.

It all started when I bought an automatic record player—the kind that handles both standard and long-playing records. Holding the changer under one arm and a bundle of records under the other, I trudged happily into the house. My wife and two young sons crowded around. With a dramatic flourish I started to unpack the new treasure. It's very hard to be dramatic when you have to unpeel a dozen cardboard wedges, but I finally got the changer and records propped up on the coffee table.

"There," I said proudly, and looked into Jane's face, expecting to see a smile of pleasure.

If she felt like smiling, she concealed her feelings successfully. She frowned at the record player as if it were something designed to produce smells instead of sounds. "Where are you going to put it?" she asked in a flat voice.

"Oh, on top of the radio, or television set, or . . ."

"Or nothing! That precious junk of yours has made a shambles of this room." After the manner of most wives, mine was pretending that everything she didn't like belonged to me.

But she had a point. Radio, TV, a phonograph, might be fun to have, but they looked a mess. I realized that we'd need extra space to store records. And deep down in my heart I was harboring a yen for a tape recorder. I didn't mention that. Instead I said:

"Why don't we build a cabinet—combine everything in one unit?"

As I looked around the room, Jane said nothing to dampen my



AFTER



enthusiasm. When I came to my senses a few hours later, I realized that she must have had that in mind from the beginning. She grabbed up my suggestion like the last man at the boarding-house table. Suddenly she turned all smiles, produced a pencil and paper, and started making plans.

Jane has a nice sense of design. She also has a feminine approach to technical details: if they get in her way she ignores them. Her first plan was compact. It looked like a dream on paper. I felt obliged to point out, however, that in order to make things fit we'd have to trade in our TV set for one with a 3-inch screen. We would also have to listen to the radio via headphones since she had neglected to allow space for that nasty old loudspeaker.

She then tried a new approach on a much grander scale: everything was to be built in and concealed. Timidly I suggested that our next-door neighbors might object to having the back of our television receiver project 8 inches into their dining room. (We live in an attached house.)

We stared at the walls for a few minutes. "Look," Jane said at last, "why don't you make a list of the technical requirements? Then I'll design cabinets to fit."

That sounded like good sense to me and I told her so. "But," I added, "there's no



Here's the assembly after we added the speaker cabinet. My wife thought it improved the sound but didn't help the appearance.

point in going to a lot of trouble and expense over something that we'll grow tired of in a year. Let's make this a really first-rate job."

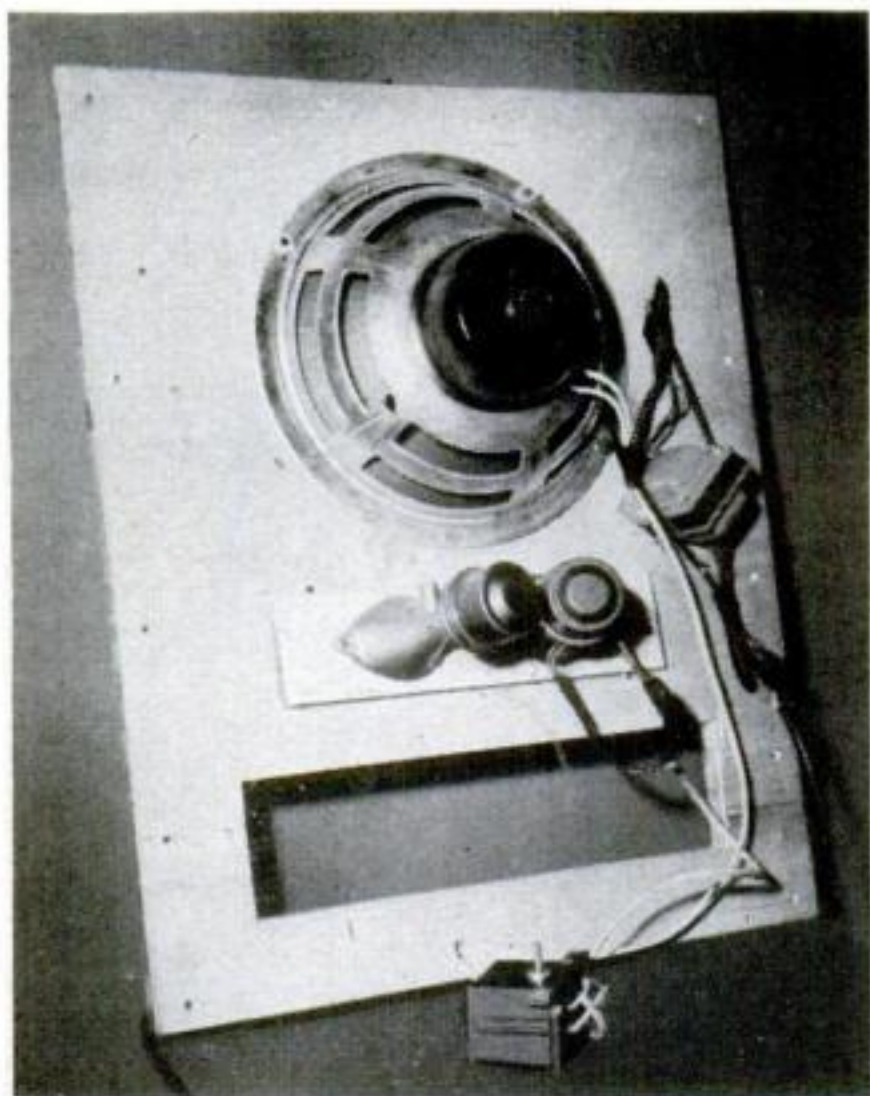
"Agreed," replied my wife. "Where do we start?"

"With the sound system. It's pretty good now, but we can make it better."

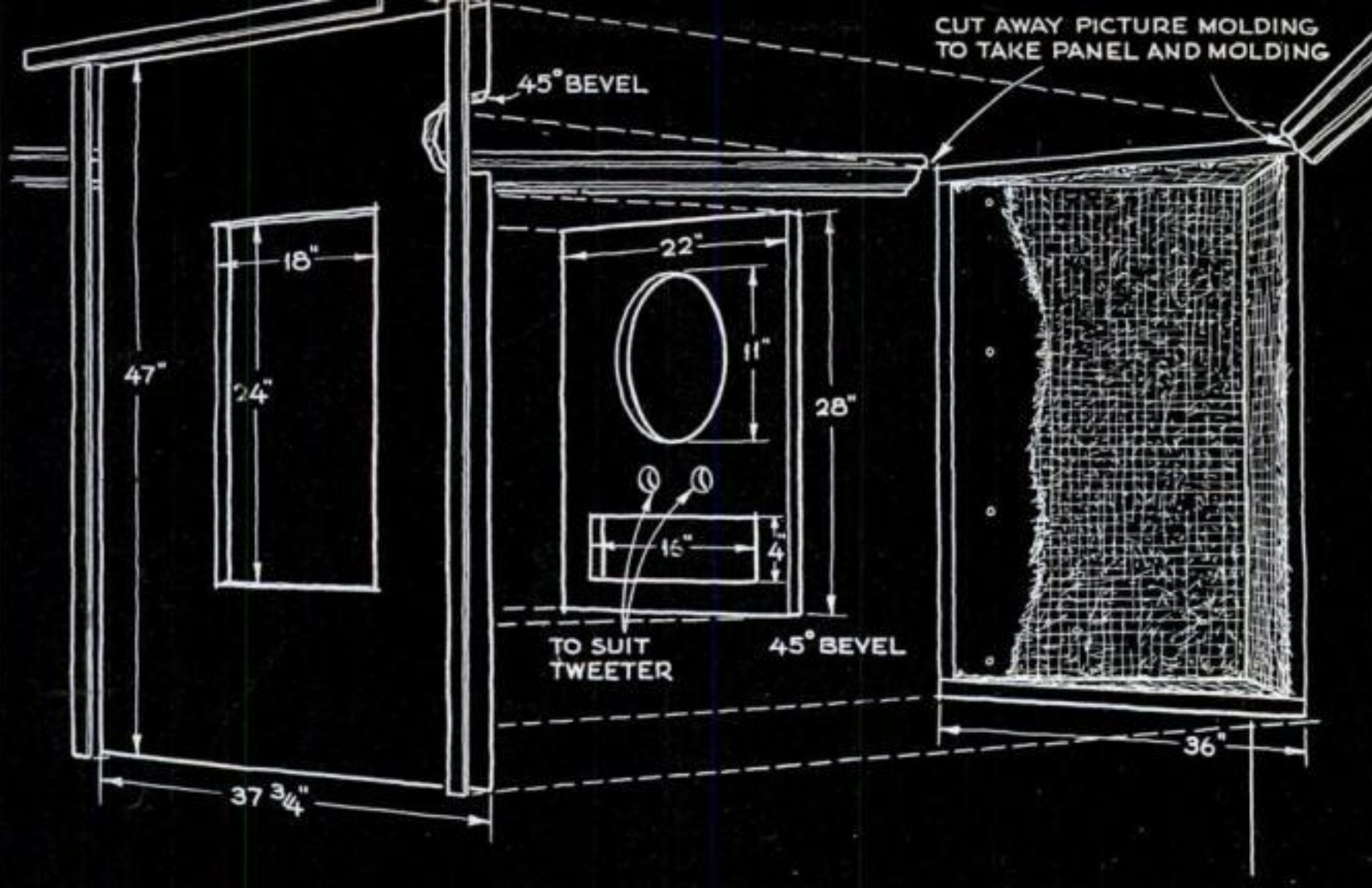
To explain why I wanted to begin with the sound, I have to tell you something about the parts of our helter-skelter collection.

First, there is our AM-FM radio and phonograph amplifier. It's an excellent job, capable of faithfully reproducing the full musical range from the rumble of the lowest bass drum to the airiest tinkle of the triangle. We'd bought the radio-amplifier chassis by itself and I had installed it in an old floor-model radio cabinet.

The bottom of the same cabinet held my loudspeaker system. I called it a "system" because it included a 12-inch speaker, a double-horn "tweeter," and a cross-over network. A large speaker can handle bass notes efficiently, but doesn't do as well with treble tones. The tweeter can handle the treble but not the bass. The job of the cross-over network was to separate music into its low and high frequency (bass and treble) components, and feed each to the proper horn.



Rear view of speaker mounting board shows the woofer (big speaker), tweeters, a new output transformer, and cross-over network.



A **reflex cabinet** like this would make almost any radio sound better. Dimensions are for a 12-inch speaker. Total volume is over 8 cubic feet. We added the molding strips to conceal irregularities of the wall.

The sound that came out of the speakers was almost—but not quiet—perfect. Vibrant bass notes didn't have the full realism I could have wished for, and when we turned the volume up loud, sound filled the room but always seemed to be coming from one point—the loudspeaker.

Wait. I know—where did I expect it to come from? Well, I wanted sound to fill the room *without seeming to come from anywhere*. What's more, I knew how this could be achieved. A reflex speaker cabinet mounted high in one corner of a room has the effect of diffusing sound and giving bass notes' richness without juke-box boominess.

To keep up my end of the bargain, I dug into a few textbooks and finally handed Jane this list:

Requirements for the Speaker

1. Size: A cabinet for a 12-inch speaker needs a *minimum* volume of 6 cubic feet. Make it larger if you can.

2. Material: The box has to be solid. If it's flimsy, the boards may vibrate and cause distortion. Figure on lumber at least $\frac{3}{4}$ " thick. Also, the box has to be lined with sound-absorbing material. We can use that old rug cushion in the basement.

3. Location: If possible, make the cabinet face the longest dimension of the room.

4. Construction: A triangular cabinet has the advantage over a rectangular one of having fewer parallel surfaces. This minimizes false resonance caused by wall-to-wall reflection inside the box.

At the bottom of the sheet I drew a sketch of the speaker-mounting board, showing position and size of the openings that would be needed.

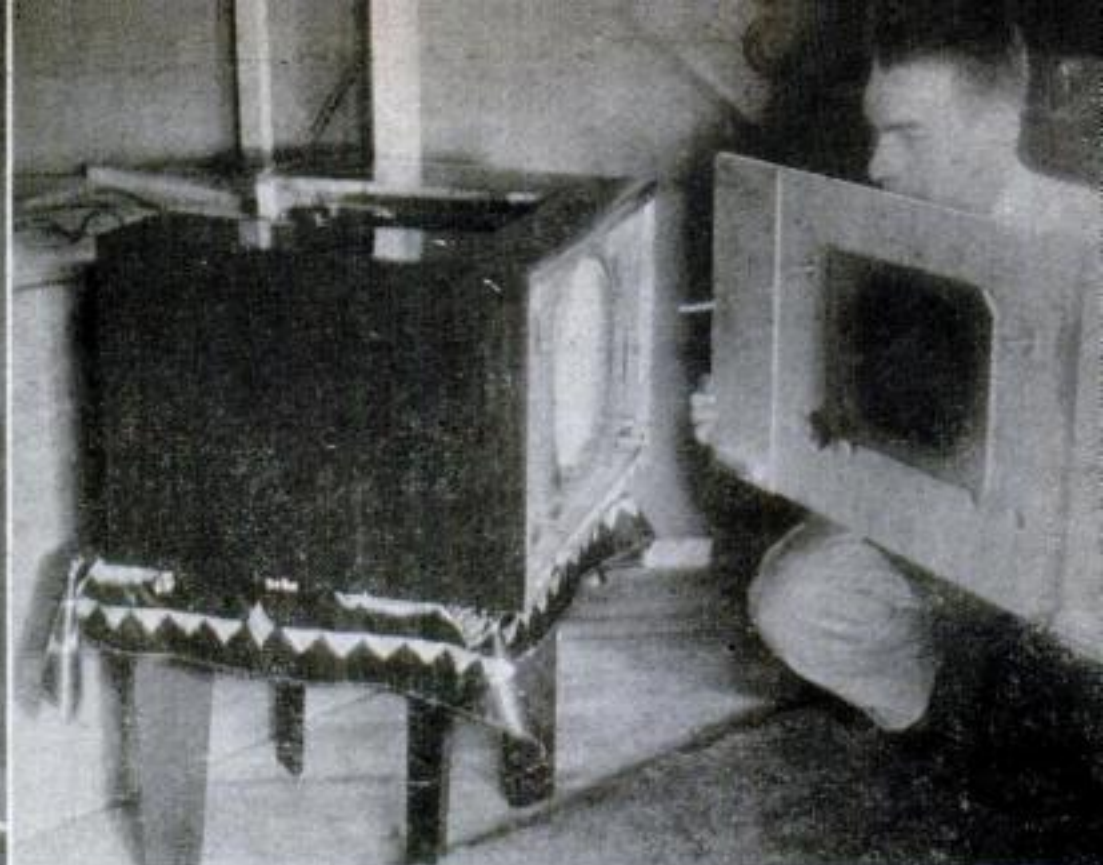
On the strength of points 3 and 4, Jane decided to angle the box in a corner of the room. First she scaled a couple of sketches. Then she produced some large grocery cartons and supervised while I made a cardboard mock-up. At her direction I whittled a little here and there until she declared herself satisfied with the proportions. We then rounded off the dimensions and drew up plans for the 8-cubic-foot box you see.

I used $\frac{3}{4}$ " plywood, glued and screwed the sides, top, and bottom together, and fitted the front. Since we own our own home, I mounted the box by screwing the sides to the wall studs. I cut away the molding trim that runs around the ceiling so the cabinet would fit flush. We then sliced up





Double-hinged folding doors conceal two record players and a record-storage shelf. The players ride in and out on ball-bearing slides.



I removed the front from the original TV cabinet and mounted it intact on the new panel. I used the original brackets to hold it in place.

the rug cushion and used it to double-line the interior.

After we got the front panel screwed on we noticed several tiny gaps between the straight edges of the lumber and the irregular contour of our walls. We concealed the gaps by tacking 1" strips along the edges.

Jane was almost as delighted as I was with the result. She readily admitted that she had never heard a radio sound so clear, warm, and lifelike.

But she also pointed out with some justice that she had been shortchanged in the deal. Instead of reducing the jumble of cabinets, we had so far only succeeded in adding an extra one.

"Okay," I said soothingly. "Let's get on with the job."

We then turned our attention to the television cabinet. "Here's what you have to allow for," I told her as I handed her this list:

Requirements for Television

1. **Location:** The TV screen should be placed to allow the widest viewing angle. There has to be ample seating space in front, and the arrangement mustn't obstruct doors or passages. Windows should be behind the viewer, not behind the screen.

2. **Size:** The cabinet should make allowance for future replacement with a color receiver or one with a larger screen. New sets are getting shorter and narrower, so figure the width and depth of our set, but allow several inches more in height. The screen should be slightly above the eye level of a seated person, that is, 35 to 40 inches from the floor.

3. **Space utilization:** An eye-level TV console has a lot of space that isn't needed for the chassis. I think we need a shelf for record albums (at least 13 inches high). We might use the rest for the radio or record-player, or both. I suggest that we buy Dick an automatic player for 45-r.p.m. records. These players are easy to operate and almost foolproof. [Dick, our five-year-old, had already ruined two expensive permanent needles by slamming them down on his records.] If he had one, we could ask him to leave ours alone.

4. **Accessibility:** TV sets do break down and no serviceman likes to stand on his head to get at the chassis. Make sure all units are easily removable.

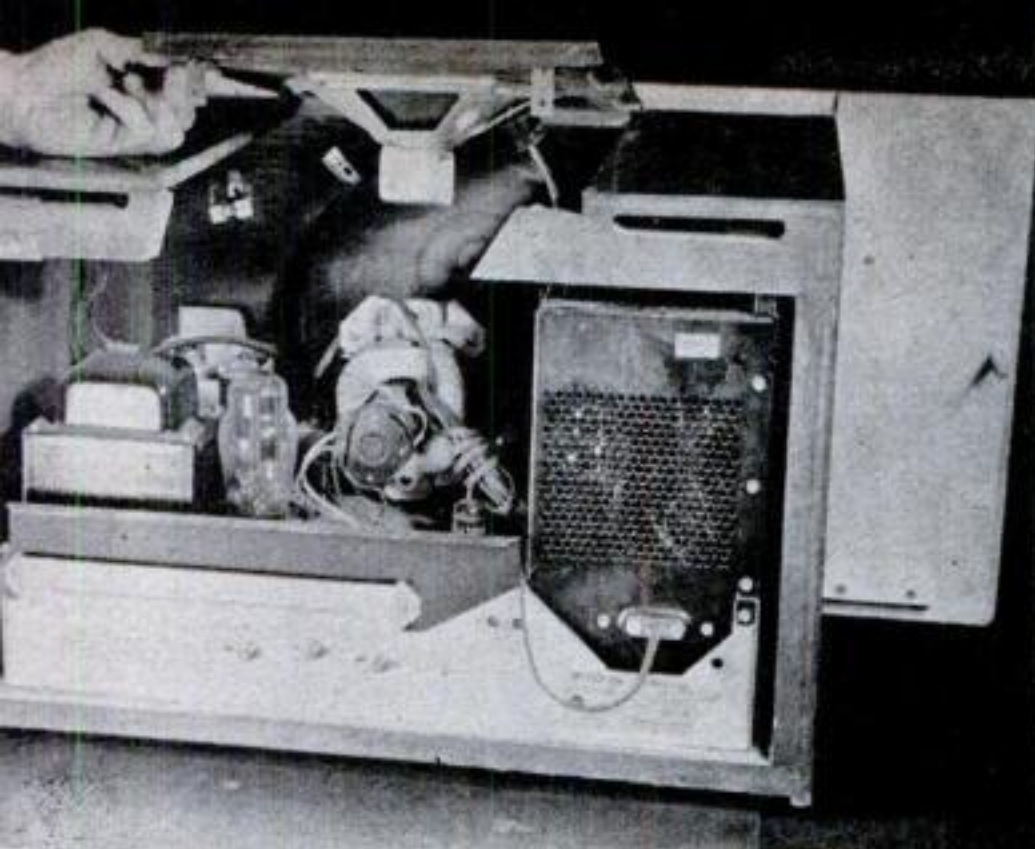
5. **Ventilation:** The chassis gets hot in operation, so have space and vents for air circulation.

For some time Jane regarded the list pensively. Once she suggested that I had made up some of the points just to spite her. But we let that slide.

The first requirement seemed to point to the corner under the speaker cabinet as the logical place in our room. We stood the TV set in the corner and drew a line straight across. It measured 64 inches. That seemed much too big. We felt the screen would be lost in the middle of a panel that long.

Jane did a lot of figuring, and I made a lot of cardboard mock-ups, but everything looked too big, dominating the room by its sheer massiveness.

Finally she had two inspirations. The first was to run the front of the cabinet part way across the corner (40 inches, to be exact) and then break the ends in toward the



The original TV speaker isn't needed in our new setup. I removed the speaker and the board on which it was mounted to improve ventilation.



The TV set just slides into its shelf. Two headless bolts are threaded part way into the panel. They're held by wing nuts on the inside.

walls. The photos show what I mean.

Her second idea concerned decoration rather than actual construction. It was to paint the speaker cabinet to match the walls. Thus the whole assembly would seem to fade back into the corner.

With this much settled, the rest was fairly clear sailing. She proportioned the doors and shelves to accommodate two record changers and an ample stack of records, and decided that she wanted the unit faced with a blond, natural-finish veneer (the actual choice was a burlled birch). She also proposed that we retain the entire front of the old cabinet as a mask for the picture tube.

From her plans I made up working drawings and figured out the amount of lumber I would need. "I hope the veneers match," I remarked, as I completed the list of materials.

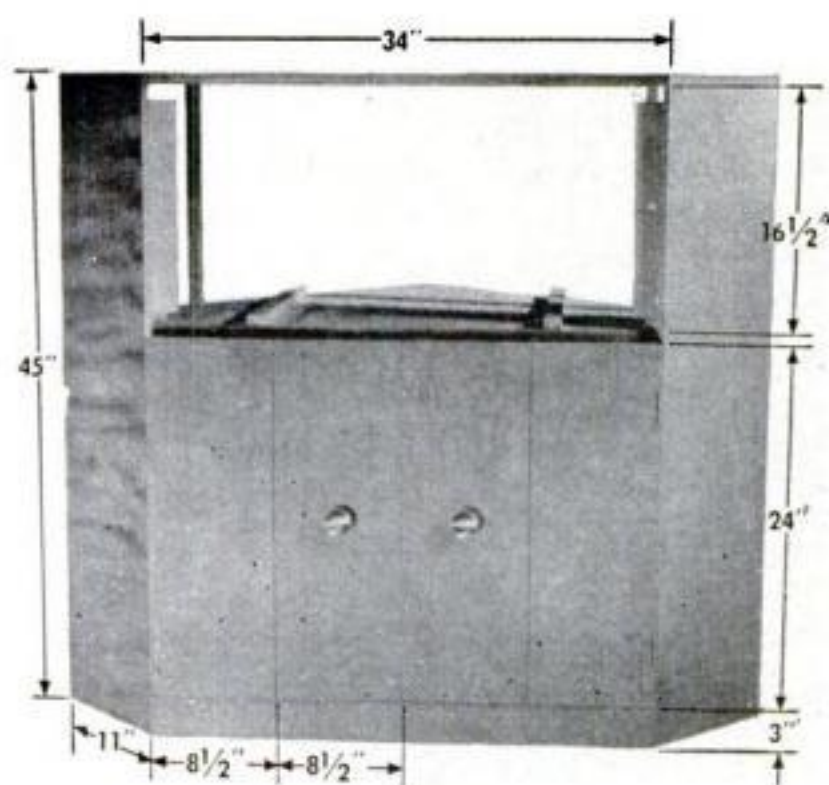
"You hope!" Jane exploded. "You go down to the lumber yard and tell them you want to pick out the pieces."

I laughed a tolerant, husbandly laugh. "You can't do that," I explained. "They're not going to waste a day selling me a couple of pieces of plywood."

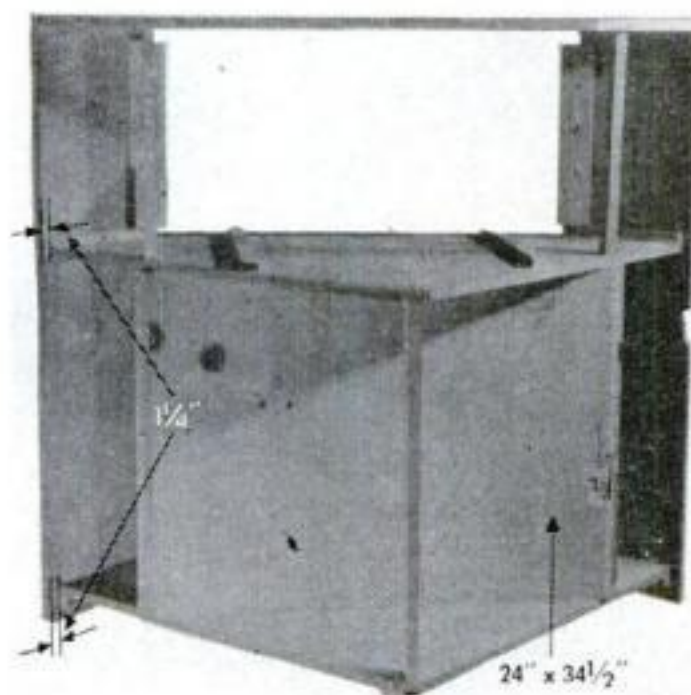
But I went anyway. I expected the salesman to give me the fish eye and a couple of cracks about guys who don't know what they want. Instead I found them patient and very helpful. They seemed to expect me to examine each panel and pulled out a great many for me to choose from.

I've been building things most of my life but it had never occurred to me to select my own lumber. Jane took it as a matter of course. How do women know these things?

One other point about our installation is



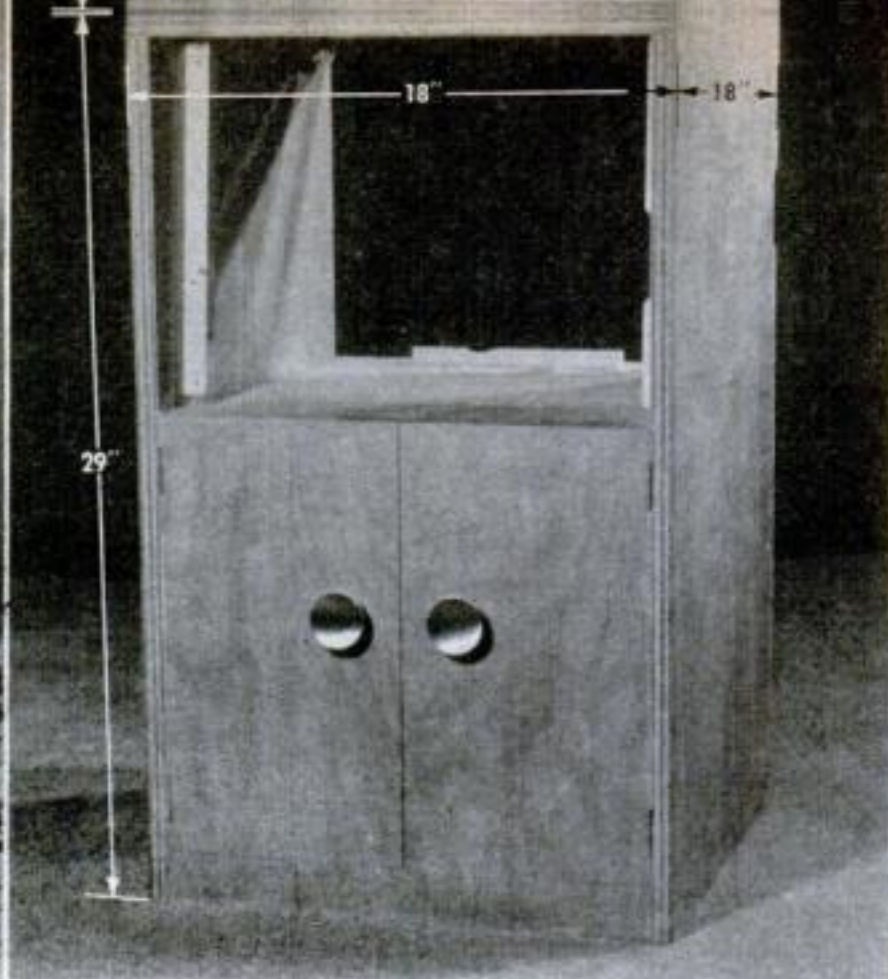
FRONT VIEW



REAR VIEW



The on-off switch, volume, tone, and selector knobs on this panel control all the units in the combination. Cabinet below is for storage.



I tacked strips to the inside walls of the radio compartment to act as stops for the plastic panel. No other attachment was needed.

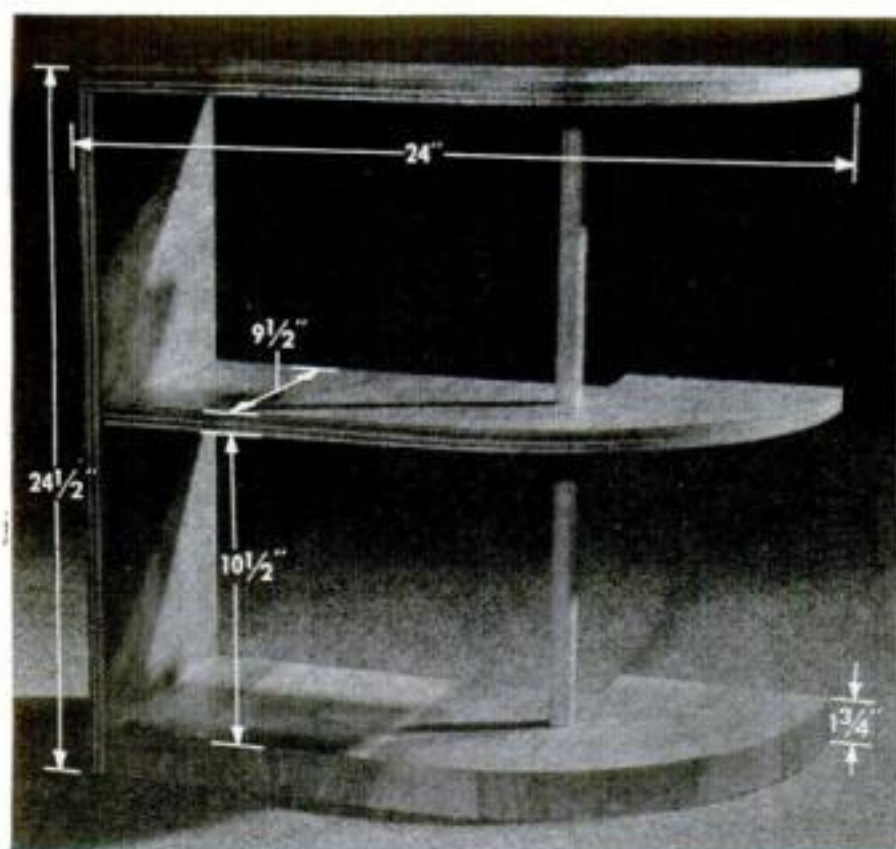
worth mentioning. Our excellent radio-phonograph and loudspeakers had spoiled my ear for TV sound. It's no secret that video receivers, especially table models, put most of their emphasis on picture. By contrast with our radio, television sounded tinny and thin.

So I called in the service company that maintains my TV set. They connected its sound output to play through the good amplifier. The job was inexpensive, and did not affect our service policy. But it made a great difference in our enjoyment of TV.

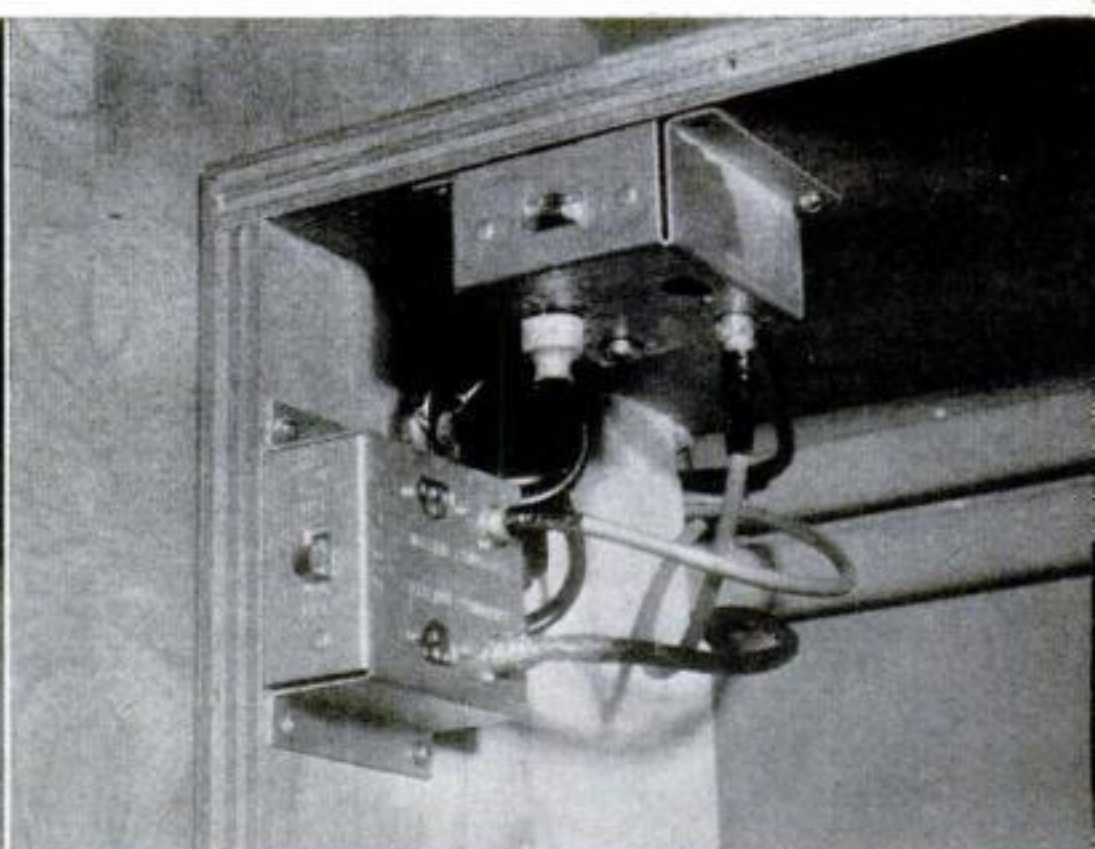
After the strenuous effort that went into

the television cabinet, I'm tempted to refer to the three remaining pieces as "incidentals." But they're not incidental at all. Jane insists that the radio cabinet and two bookcases tie the corner together. By balancing off the large center unit, they make it look smaller than it really is.

At first we thought of placing the radio close up against the TV cabinet. Jane nixed that idea. Then it occurred to me that since all the sound controls are on the radio panel, it would be nice to have them at your elbow as you sat at viewing distance from the screen.



This rounded-end bookcase serves as an end-piece along one wall. The wall has a setback near the staircase, so I notched the shelves to fit.



Two phono-selector switches connect the TV receiver and record players to the amplifier. Plugs permit easy removal of any unit.

Jane agreed. I'm glad she did, because I have since discovered how convenient this arrangement is. When I'm watching a fight or some other TV show that doesn't need sound, I can switch off the announcer and tune in some pleasant background music without stirring from my seat.

I had very little planning to do in connection with these three pieces. They practically dimensioned themselves. I cut out a plastic front panel for the radio and then just measured the chassis. Keeping the controls on one panel presented a bit of a wiring problem. As I mentioned before, we wanted each separate unit in the combination to be easily accessible for servicing. Accordingly, I made sure that the wires running between the units were readily detachable.

Plugs and Sockets Connect the Units

In a job like this there are two types of wires to worry about: the 115-volt power leads, and the sound-output wires that go to the amplifier. Each unit has its own on-off switch, but I wanted to be able to turn off all power at one point. This isn't just a convenience; it's a safety feature. When the pilot light is off I know that there's no power in any part of the setup.

Like most good radio-phonographs, mine has a feed-through power socket mounted on one edge of the chassis. This socket is controlled by the switch in front, and is put there to provide an outlet for the phonograph motor. I plugged a multiple outlet

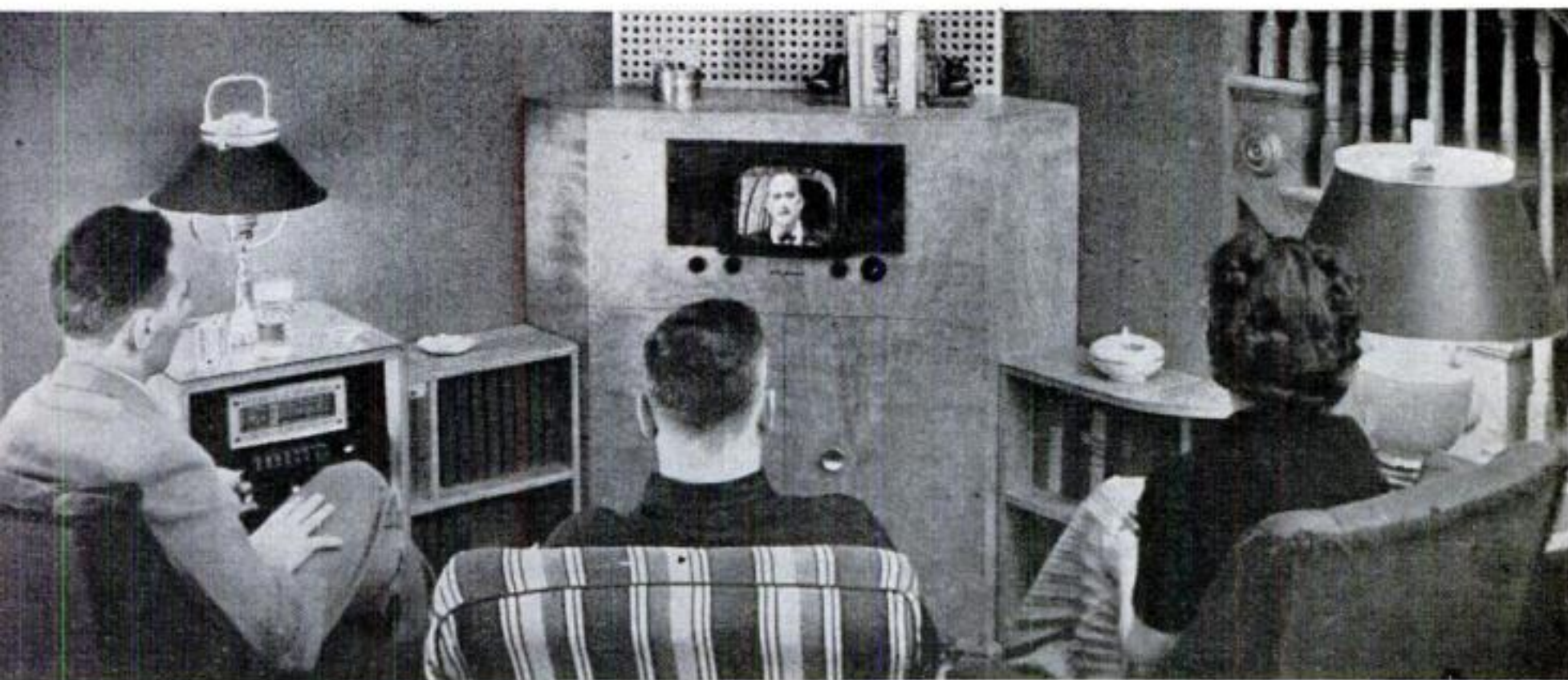
into this socket and wired the two record changers and the TV set to the outlet. Switching off the radio automatically turns off the other units. Since the connections are made with standard plugs, there's no difficulty about separating the pieces.

Sound-output wires are handled similarly. Again, like most standard radio-phonographs mine has a selector switch on the front panel. The switch has three positions, one each for AM, FM, and phonograph. A phono-input jack on the chassis is linked to the third switch position.

To make this one jack serve for three plugs, I purchased two record-player selector switches, wired one to the jack, and made the remaining connections to the switches. All connections are of the jack-and-plug type.

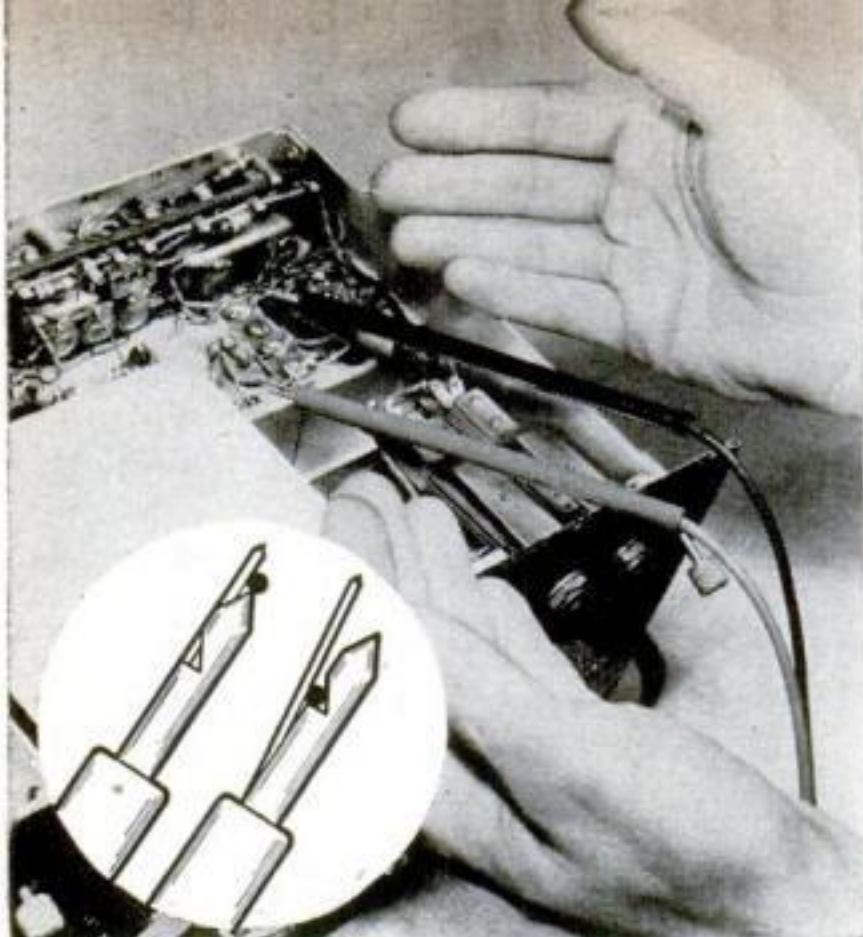
Before applying a finish to our cabinets, we gathered up a few leftover scraps of wood and experimented with several different stains. Our final choice—Jane's, I should say—was a light stain and several coats of wax. The stain darkened the wood very slightly and brought out the birch grain. We protected the stain with paste wax, rubbing each coat hard before applying the next.

There's one other thing I should probably mention. Jane won't know it until she reads this, but I designed a couple of extra inches into the width of the radio cabinet. It leaves just the right amount of space underneath for that tape recorder I've had my eye on for a long time. END



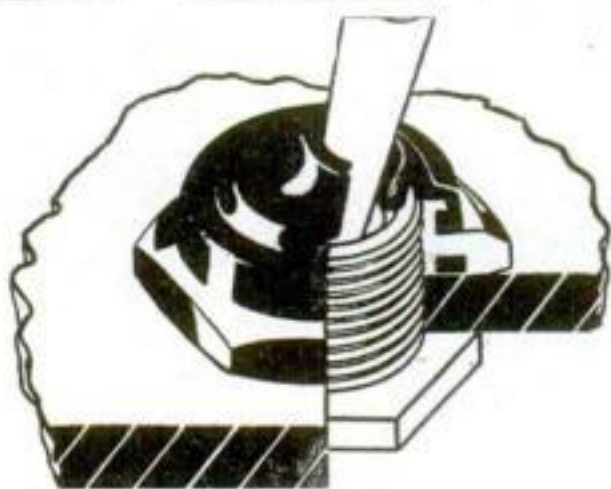
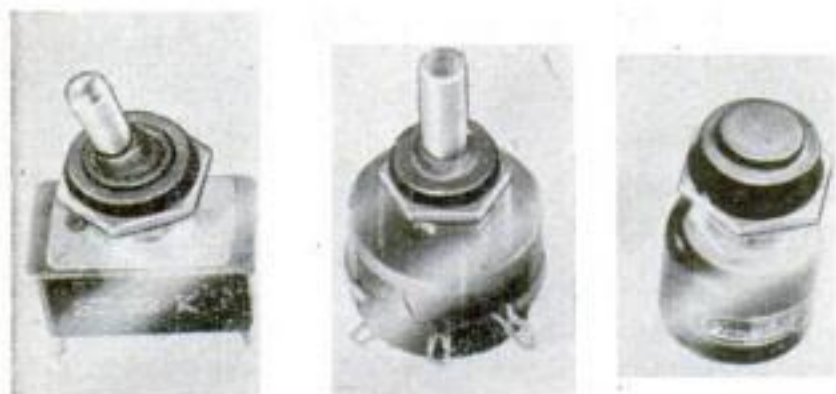
Men—and woman—not at work. We now take our entertainment in solid comfort. The seating arrangement was part of the plan. Power, tone,

and volume controls are on the panel at the left; selector switches, in the bookcase next to the radio cabinet, are within easy reach.



Test Prod Clips to Wire

TEST-PROD tips that take hold of wires free your hands for soldering or making servicing adjustments. The Klipzon prod, made by United Technical Laboratories, Morristown, N. J., has a steel needle that is spring-held against a notched tip. Pressing down on the prod forces the needle outward until it engages the wire, as shown in the inset. A pull releases the prod.



Nuts Waterproof Switch Shafts

LEAK-PROOF seals for switch and control shafts help keep moisture, dirt, and fumes out of electrical equipment. The waterproof assemblies above, called Sealnuts, are made in sizes to fit most shafts. Each unit consists of a neoprene cap and gasket and a nickel-plated brass nut. Sealnuts were developed by Radio Frequency Laboratories, Boonton, N. J., to meet Navy requirements.



Hummer Helps You to Sleep

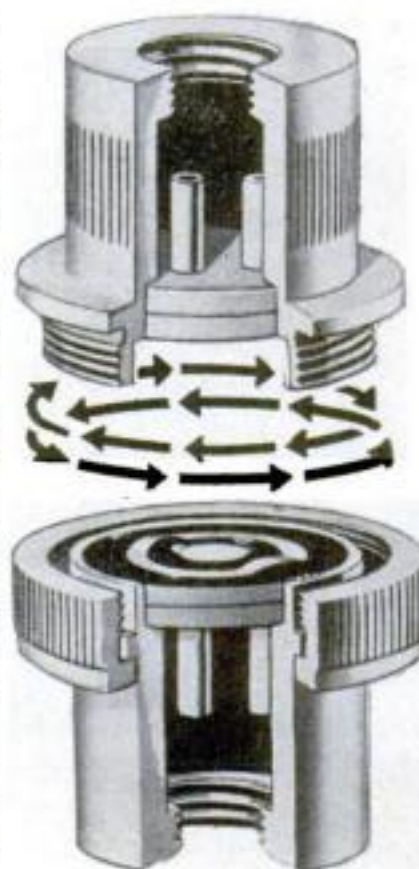
Is YOUR summer place too quiet at night? Some people find it hard to fall asleep without a lullaby of droning city noises. If you are one of these, a "sleep hummer" may help you catch up on your rest. This simple electric gadget produces a low-pitched, steady hum that tends to relax the mind and body.

To make one, mount a bell transformer, loudspeaker, volume control, condenser, and switch in a small box, and wire the parts as shown in the diagram. (The condenser can be a 30- 50-mfd. dual electrolytic with the two sections wired in parallel).

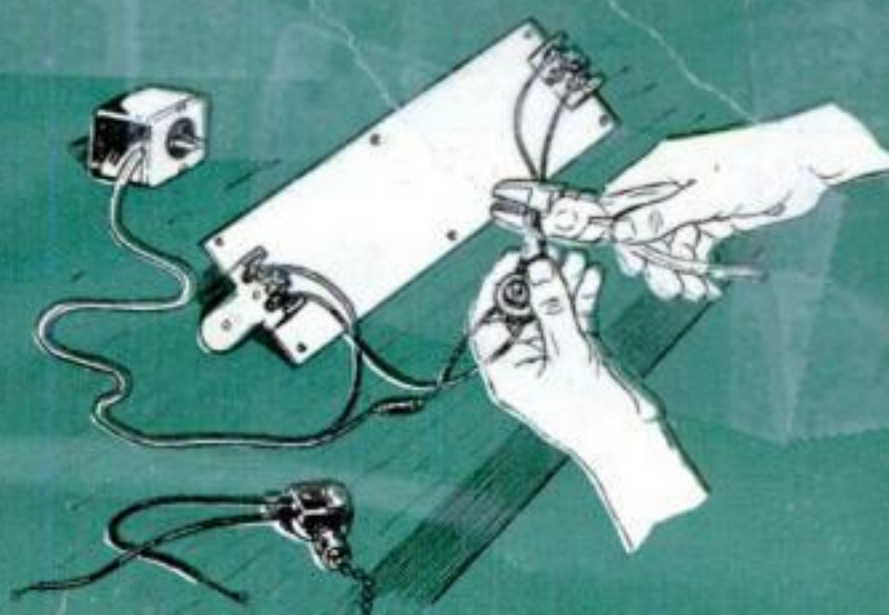
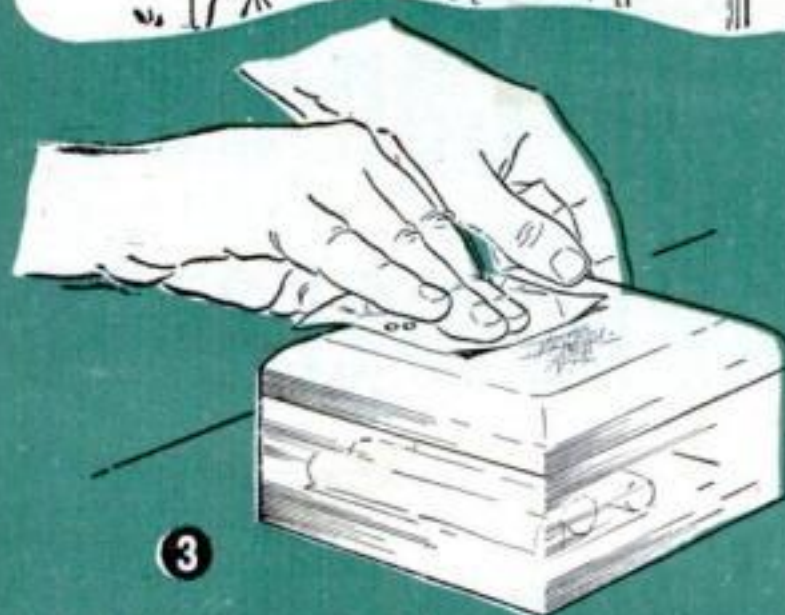
A sleep hummer may also be helpful in noisy places, for its soothing tone may serve to mask high-pitched, jangling sounds that might otherwise disturb your slumber.—*H. G. Eidson, Jr., Columbia, S. C.*

Rotating Electrical Connector

THIS swivel connector permits electrical fixtures to rotate any amount in either direction without tangling wires or interrupting the current flow. The swivel consists of two freely rotating halves joined by a threaded flange and collar. Phosphor-bronze contact rings maintain electrical connection. Robboy Electric Mfg. Co., Cleveland, makes 2-, 3-, and 4-wire swivels.



WHAT'S WRONG ?



A GOOD handyman knows some of the tricks of a lot of trades. But it's a rare fellow who knows all the tricks of all the trades. You can tell that each of the jobs above is being done by an amateur because a mistake is being made that a professional would avoid.

1. This isn't the best way to paper a wall, although it is often done.

2. When the control switch on this

fluorescent went floeey, this fellow decided to cut it out and replace it with another switch.

3. A network of light scratches disfigured this plastic box. Here our fixit man is smoothing the lid, using fine 00 sandpaper, of course.

4. Many painters buy white paints and mix their own colors. It's cheaper that way, and they can match shades.

Answers

1. The lapped joint faces the wrong way. The man should lap the wallpaper *toward* the window. This would make the shadow of each lap joint less noticeable.

2. The switch being cut out of the lamp has four wires—two for the on-off circuit and two for the starter circuit. The regular SPST switch shown on the table cannot replace it.

3. Even fine sandpaper puts more scratches into plastic than it takes out. To remove small scratches, use toothpaste or other fine abrasive. Another way is to rub the plastic

with very fine waterproof garnet paper, used wet. The light frosting that results can then be buffed off.

4. Colors-in-oil should not be added directly to the paint. The color should be dissolved in thinner, and then strained through cheesecloth. This keeps out undissolved spots of color and prevents streaking. Reds, blacks, and blues are particularly liable to form spots if not mixed properly. It's also a good idea to pour off half the paint and color each half separately. This makes it easier to correct the color if, by chance, you make it too dark.



Singers Mimi Benzell, Earl Wrightson.



George McManus, cartoonist.



Dr. Roy K. Marshall explains . . .



. . . how a con rod and piston work.

TV's Images Can Be Photographed

PS photos by W. W. Morris

THERE'S a new hobby awaiting you these days—making a scrapbook of TV scenes. Sitting comfortably before a television set, you can snap photos of celebrities, sports events, and pin-up girls.

But to take such photos, you must



Lou Little, Columbia football coach.



Lynn Bari, Ken Murray, and TV pup.



Actress Arlene Francis.



Careful timing gets sports shots, too.

know the tricks. A simple box camera won't do. Nor can you point a flash gun—as some unthinking characters already have done—and wind up with anything but a photo of the set and a blank screen.

In TV photography you must work with the light from the screen itself. Since this isn't very intense, your shooting speeds have to be slow, anywhere between $1/5$ and $1/25$ second, and the lens must be opened wide, or almost so.

Even if the light were brighter, the nature of a television image would limit your top speed to $1/30$ second. In a television tube, all the scanning lines forming a complete picture frame are repeated at the rate of 30 times a second. Any photo snapped at a speed faster than $1/30$ second, therefore, would be only part of a picture—if you got anything at all.

You can use any camera with a ground-glass back that will focus down



Dave Garroway of "Garroway-at-Large."



A bit of action during a roller derby.



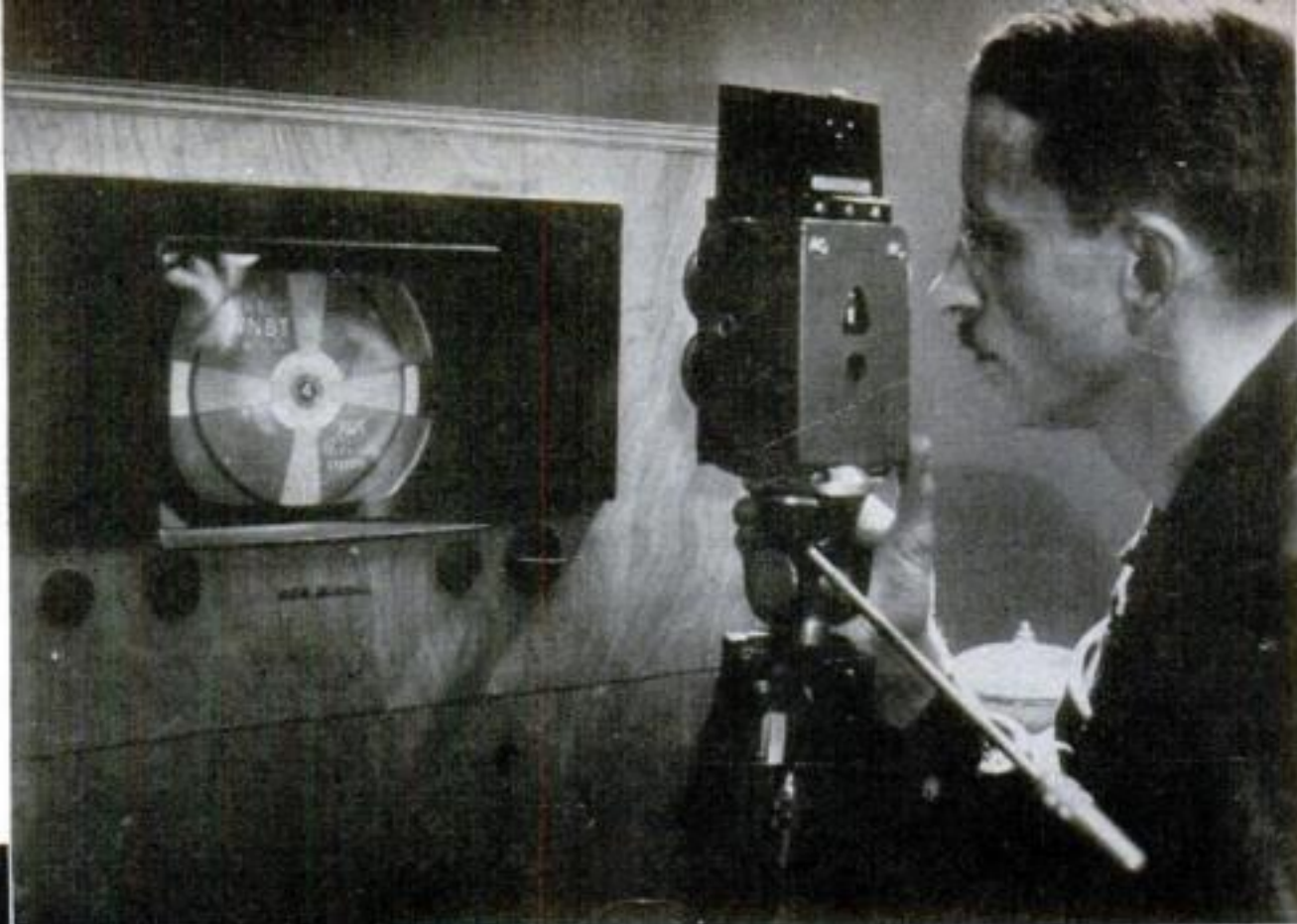
Arthur Godfrey and his famous uke.



Chorus scene from "Show of Shows."

Focus on test pattern before program begins. TV photos on preceding pages were taken with Kodak Reflex II, right. A Chess United +2 portrait lens was used on its f/3.5 taking lens.

A piece of ground glass in the exact plane of the film, below, provides exact focus and framing if you use a folding camera. After focusing, load your film without moving camera.



to two feet or so. Lacking that, you can put a portrait attachment on a twin-reflex or folding camera. The object is to get close enough so the image of the television screen fills the negative. If there's a shiny metallic border around the screen, mask it with black tape. In some sets, this border is at an angle and may reflect enough light to weaken the contrast.

Set the camera on a sturdy tripod and focus on the test pattern before the program begins. Adjust the television image to normal contrast, that is, one with a full range of tones—the same sort of image you would want for viewing.

If you are using a twin-reflex or folding camera, remember to compensate for parallax while setting up the camera. Use Super XX or other very fast film.

All the accompanying television photos were taken on a 10-inch screen with one of two camera settings—either 1/10 second at f/4, or 1/25 second at f/3.5. If your camera has an f/4.5 lens, 1/10 second

will probably be as fast as you can shoot.

At any speed, exact timing in snapping the shutter is essential. With the shutter cocked and your finger on the trigger, wait until your subject reaches the end of a sentence. Then shoot. In almost all cases, a speaker or singer will remain motionless at that point for a brief interval.

Develop your film a third longer than the usual time you would give it. This builds up the contrast and saves many negatives that otherwise would yield only the flattest of prints. If you take your film to a drugstore for processing, find one that will do this for you.

With television negatives, you can't expect extreme enlargements. But your best ones should easily blow up about three diameters if carefully handled. **END**

POPULAR SCIENCE will pay for photos of images on your TV screen. Twenty-five dollars will be paid for the best one received before Sept. 30, 1950, \$15 for the next best, \$10 for the third best, and \$5 for each additional one selected for publication. On the back of each photo, write the name of the TV station and program, the date and time of day you took the picture, exposure data, kind of camera used, and your name and address. Send negatives with all photos to TV Photo Editor, Popular Science, 353 Fourth Ave., New York 10, N. Y. Pictures and negatives cannot be returned, unless stamped and addressed envelopes are enclosed. The editors' selections will be final and will be based on subject matter and technical quality of the photos.

Twin-Image Cap Sharpens Photos

BY INSTALLING a simple, homemade accessory on a twin-lens reflex camera, you can focus it by merging two images—much as you would with a costly split-image rangefinder.

The accessory is a two-holed cap mounted on the focusing lens. While a subject is out of focus, the cap throws two overlapping images on the ground-glass viewer. When they merge, focus is perfect.

You can quickly test the cap's effect. Put a strip of opaque tape across the middle third of the focusing lens. This splits the light into two beams. When your camera is in focus, these two beams will converge into one—and you see a single image in your viewer. When it is out of focus, however, the beams converge ahead or behind the critical point, and you see two images.

Photographers sometimes use the same trick to focus enlargements. For instance, a narrow strip of tin bent and clipped temporarily across the center of the enlarger lens produces a twin-image effect.

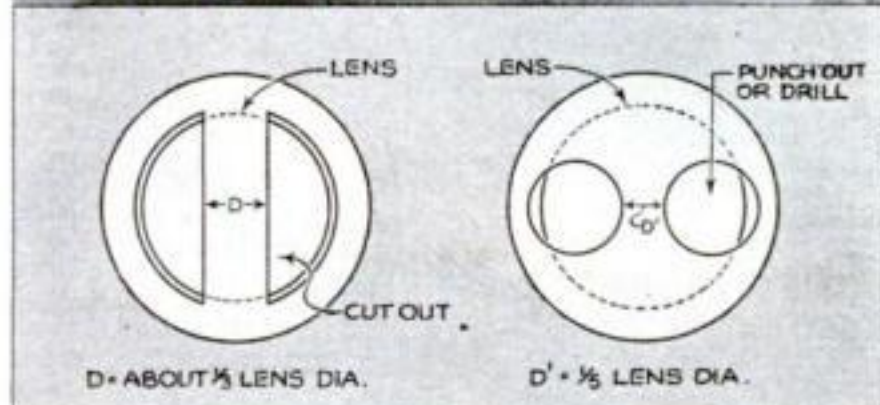
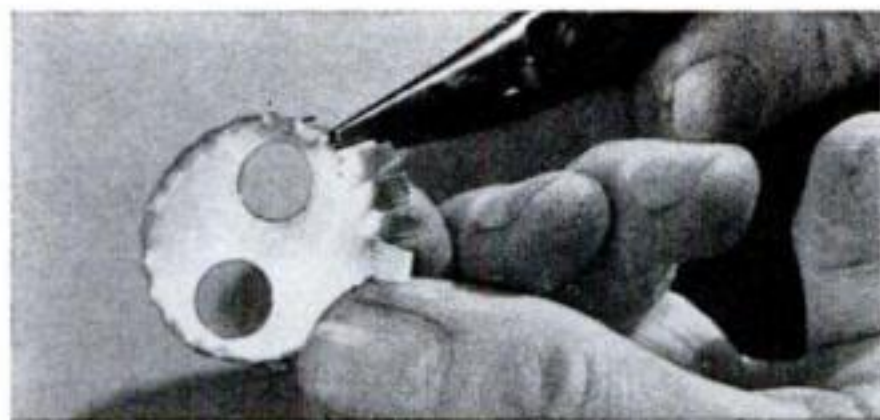
The cap shown in the photos was made



Fitted on viewing lens, cap shows two images on ground glass—until subject is in focus.

by cutting a disk from thin aluminum and then notching and bending the edge. Felt cemented inside the rim prevents damage to the lens barrel. A thin glass disk cemented in the cap will keep dust from the lens. A piece of filter gelatin or colored glass over one of the openings will make one of the double images a different color.

It's best to place the cap so the images are seen side-by-side rather than one above the other. Focus on a vertical line.—Walter E. Burton, Akron, Ohio.



Half-moon openings are best because they pass more light, but drilled holes are easier to make. Cut edge as at top and crimp over lens.



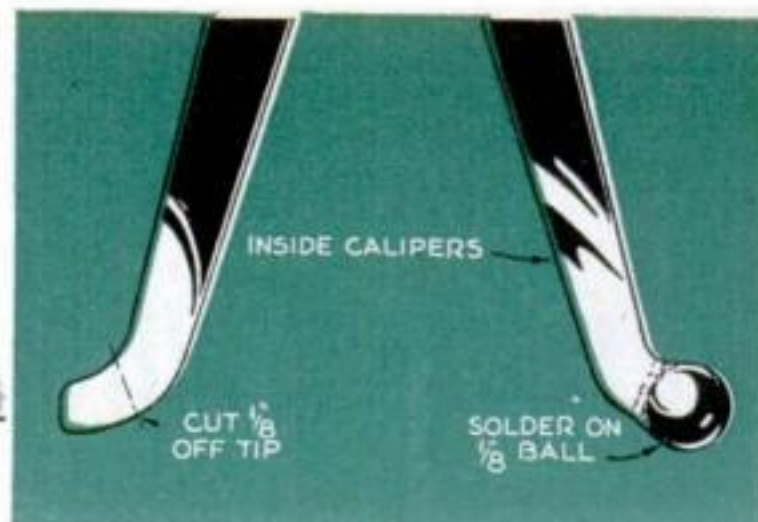
What you see. If subject isn't in focus, it shows double lines, as at left. To focus, you move lens until lines merge as at the right.



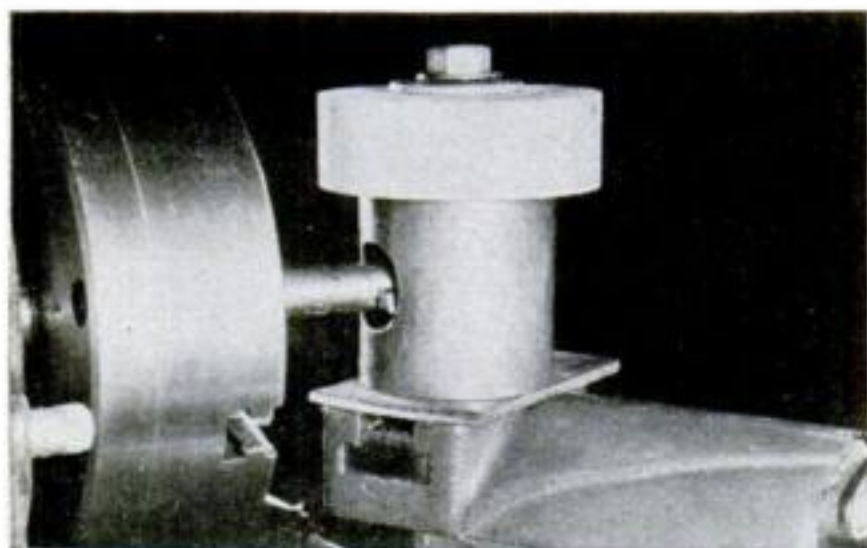
NEW SHOP IDEAS

Ball Calipers.

The flat ends of inexpensive inside calipers make it hard to get really accurate readings, especially in small bores. I cut a little from each tip and soldered on a $\frac{1}{8}$ " bearing ball, being as sparing of the solder as possible. Because of the true radius



and high polish of the balls one can, after a little practice, measure within a thousandth of an inch.—*J. O. Devau, Derby Line, Vt.*

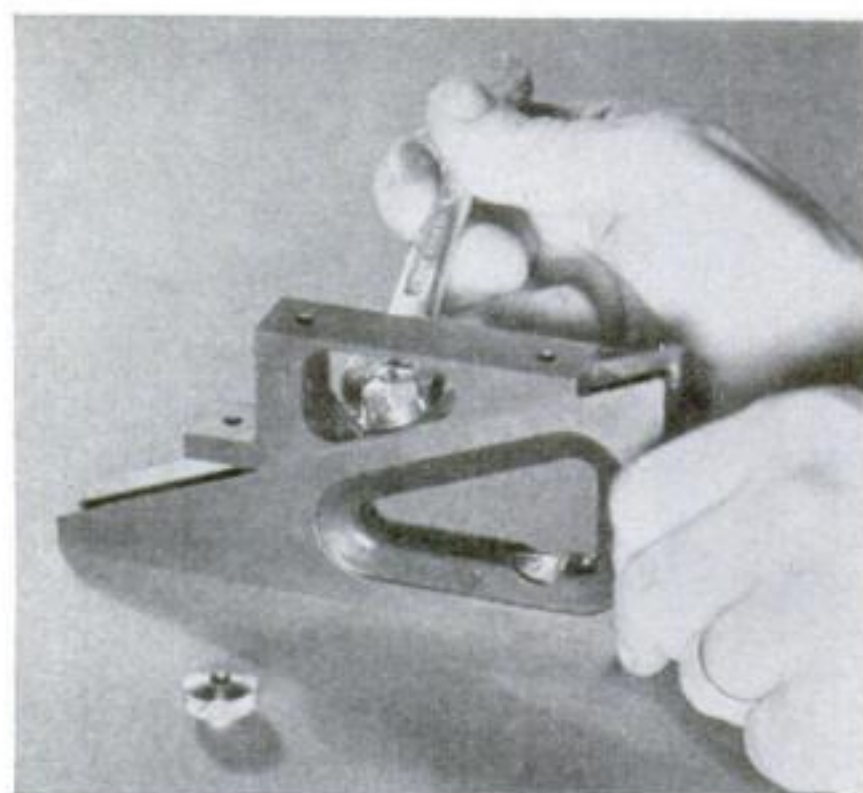
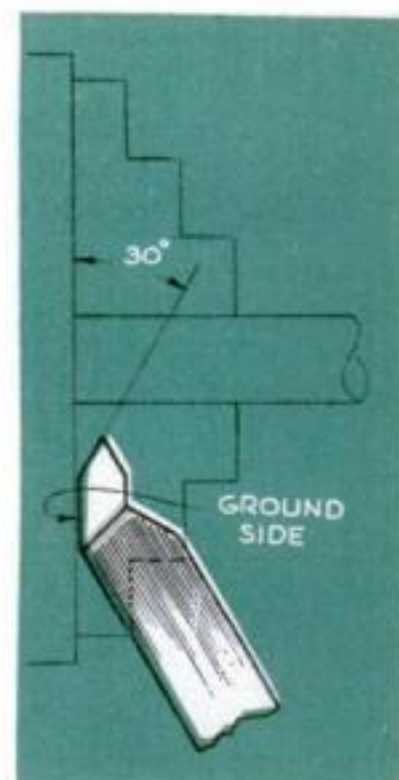


Lathe Bores Holes in Tube. Thin walls, a curved starting surface, and the difficulty of holding the job make it hard to get clean large holes in tubing. Here's a good way to do it in the lathe.

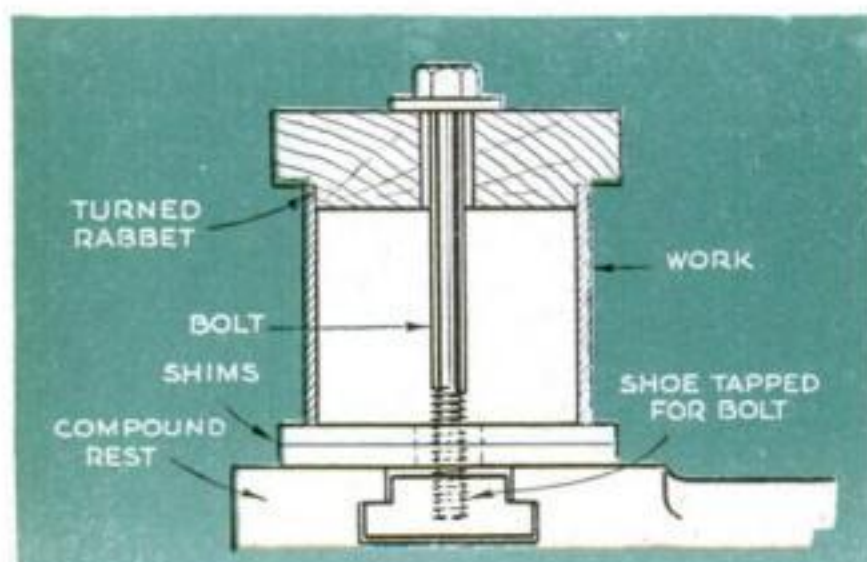
Chuck a piece of hardwood and turn a rabbet on it to fit inside the tube. Drill a center hole in the wood for a bolt. Then clamp the tube on the compound rest as shown, with shims if necessary to bring the hole center to lathe-center height. Drill a small pilot hole, open out with a larger drill, and finish with a boring tool as in the photo, adjusting the bit in the bar to bore the desired radius. Lock the gibs on both cross slide and compound to prevent chatter.—*Joseph Tracy, Manhattan, N. Y.*

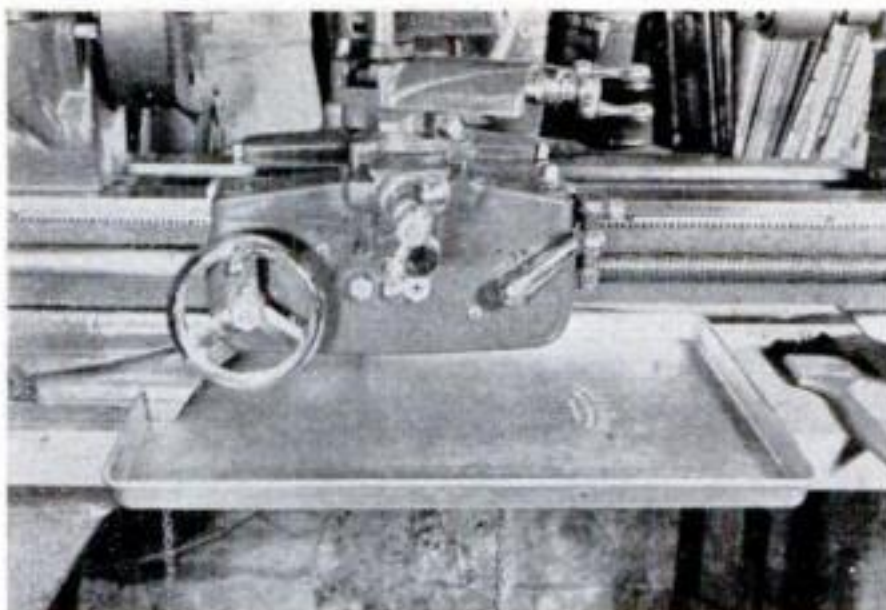
Threading Tool Sets Itself.

If you grind one side of a forged threading tool at an angle of 30° to the point, as shown, you won't need a threading gauge to set it up. Just clamp it with this side flat against the chuck face or faceplate, and the cutting point will be square to the axis of the work.—*J. B. King, USN, U.S.S. Wright.*

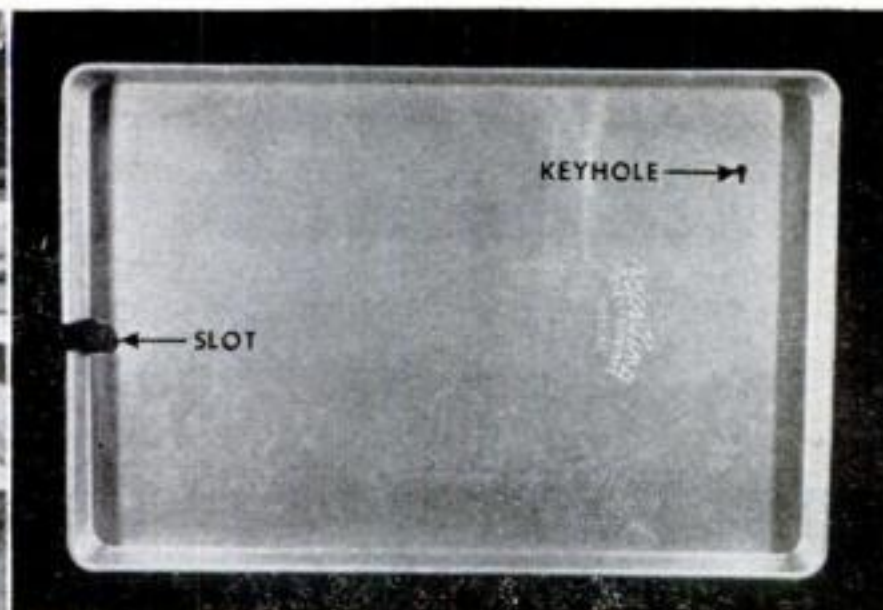


Locking Planer Gauge. When used for setting heavy sine plates, a planer gauge tended to slip its adjustment. To overcome this, a $\frac{7}{16}$ " hex nut was made up to replace the knurled clamp nut. Tightened with a wrench, the hex nut held securely.—*Henry Sevcik, Los Angeles.*



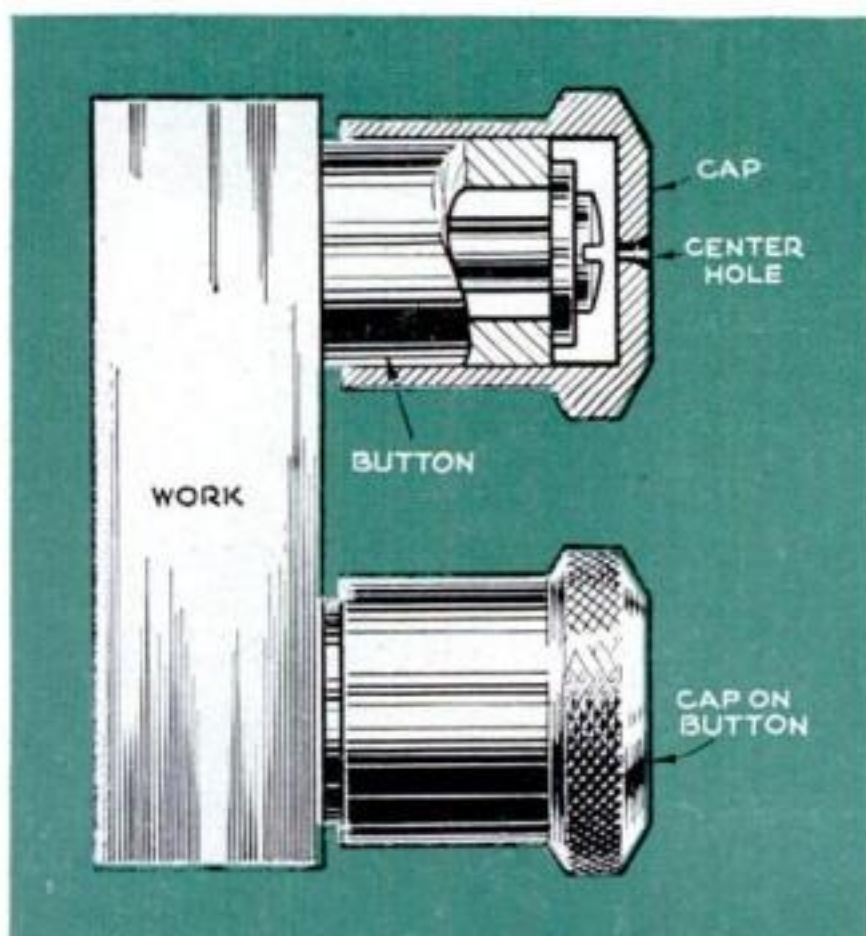


Baking Pan Catches Chips. As shipshape as the big oil pans used under industrial lathes, a good-sized aluminum cookie tray makes it a cinch to clean under your lathe. It also helps keep chips off the floor. Cut a slot in from one edge to fit around the headstock pedestal. Drill and

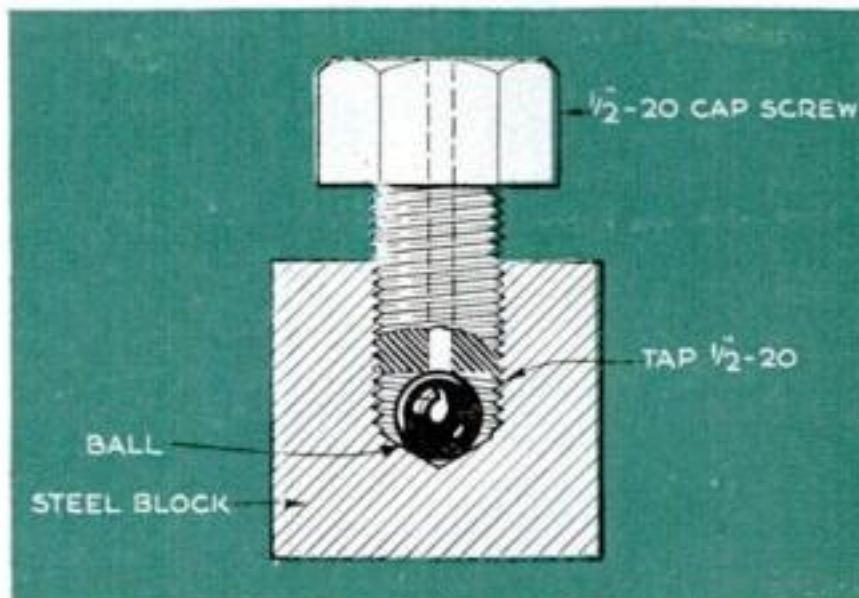


file a keyhole at the other end to engage a screw partially driven into the top of the bench or stand. This makes the tray easy to remove for dumping, but holds it in place with no danger of tipping. Cut the keyhole so that a pull is required to free it.—*Herb Pfister, The Bronx, N. Y.*

Save Your Old Taps. Just because taps are worn out is no reason to throw them away. There is good steel in them. Ground to a point, they make fine center punches.—*Warren Norcross, Philadelphia, Pa.*



Centering Toolmaker's Button. A wiggler will serve for setting up toolmaker's buttons on the lathe if you have no dial indicator. Turn a cap with a small center hole in the face to a snug fit over the button. Such a cap can also be used with a center finder for setting up work on the milling machine or radial drill.—*Jesse R. Lucas, Michigan City, Ind.*



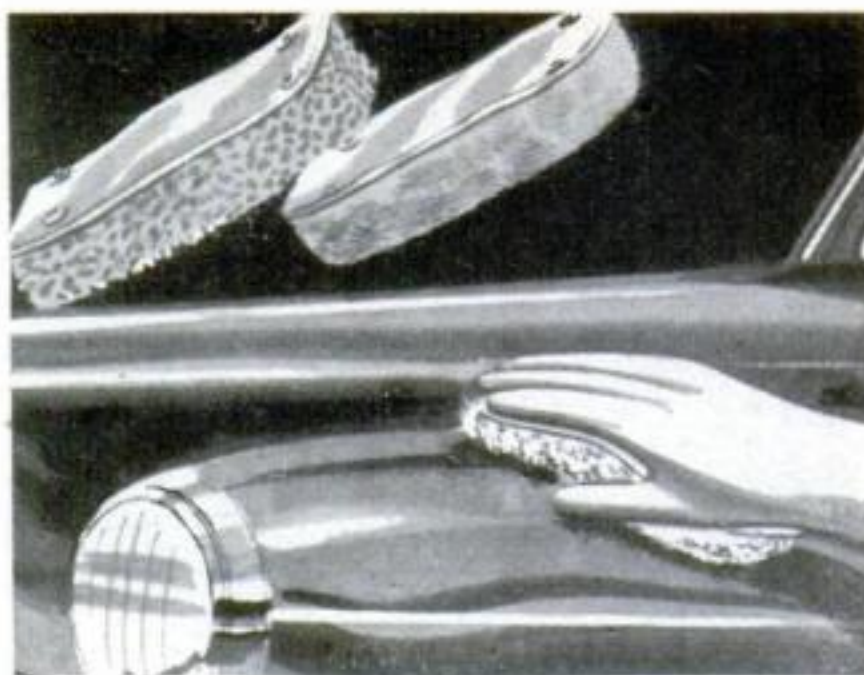
Drilling a Ball. You'll get a hole dead true on the diameter of a ball every time with this simple jig. As dimensioned, it takes balls up to 7/16". A steel block is drilled and tapped as shown. The ball is clamped in this with a cap screw that has been accurately centerdrilled as a drill bushing. Steel bearing balls must, of course, be annealed before drilling.—*John Kretzschmar, Monsey, N. Y.*

Chips Kept Out. To keep drill chips out of a closed hollow body in which a hole must be made, put some heavy gear oil or molasses on the drill point. Break through as gently as possible.—*Will Thomas, Kenmore, N. Y.*



I'd like to see them make...

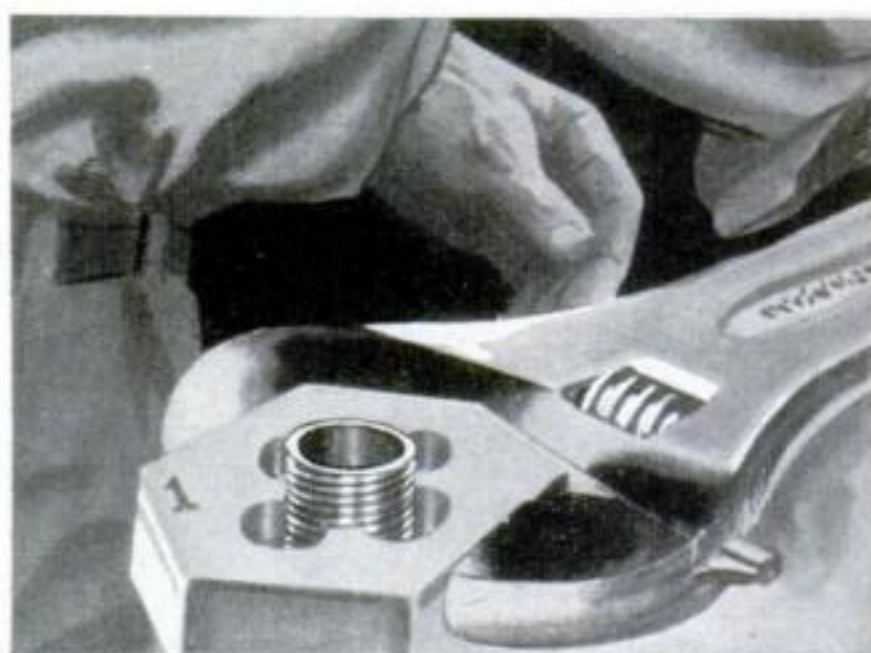
Everyone has his own pet idea of some gadget he would like to see in general use. What is **YOURS**? *Popular Science* will pay \$5.00 for each one published. Use government postcards only. Contributions cannot be acknowledged or returned.



Rubber gloves with pads. One interchangeable, snap-on pad could be sponge rubber for washing; another could be cloth for dusting; while a third could be lamb's wool for polishing.—*Arthur Miller, North Bergen, N. J.*



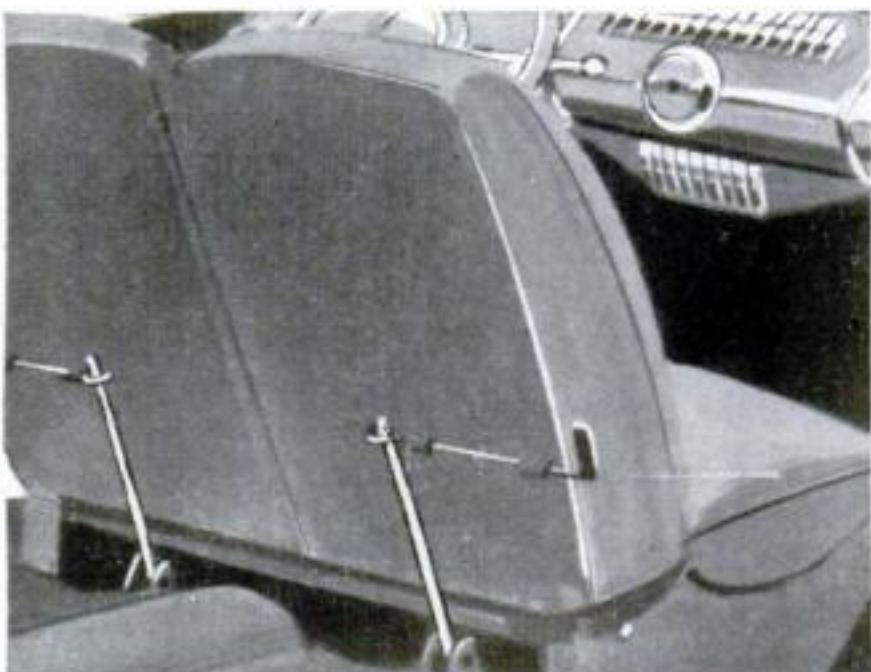
Small rubber-tired wheels of various sizes. These would be used as replacement wheels for toys when children break them. You'd be able to salvage many an otherwise useless toy.—*Mrs. S. R. Winchester, Tacoma, Wash.*



Hex-shaped dies. If they were shaped like a hex nut instead of round, rethreading dies could be turned with a wrench instead of a diestock. They'd be easier to work in tight spots.—*Walter F. Troop, Madisonville, Ky.*



Transparent cement for laying glass bricks. These would greatly improve the finished appearance of a glass-brick wall. Maybe a silica-base cement could be used to do the job.—*George Wagenhauser, West New York, N. J.*



Safety latches for the front seats of two-door cars. In case of a sudden stop or accident, a rear-seat passenger wouldn't—if thrown forward—force a front-seat rider against the dash.—*Lee A. Wilhite, Marshall, Mo.*

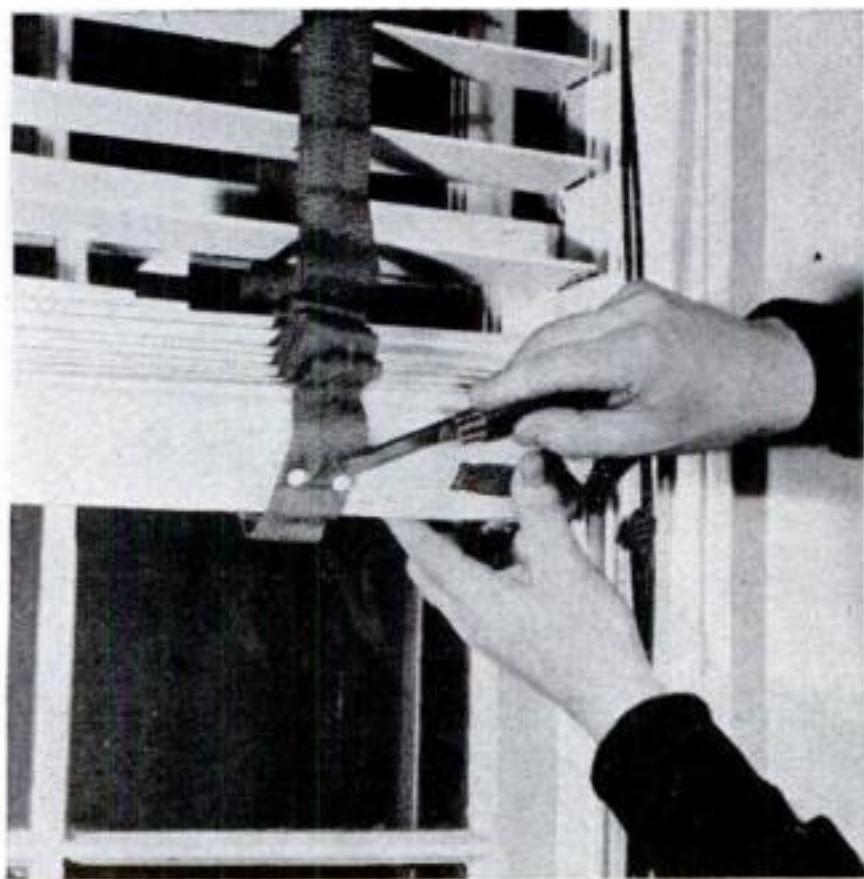
Repair That Broken Blind Yourself

SUDDENLY a rain squall blows up. You run around closing windows. As you pull at the control cords of a Venetian blind with one hand and tug at a window with the other, there's a sharp snap. And you find yourself holding a splintered slat.

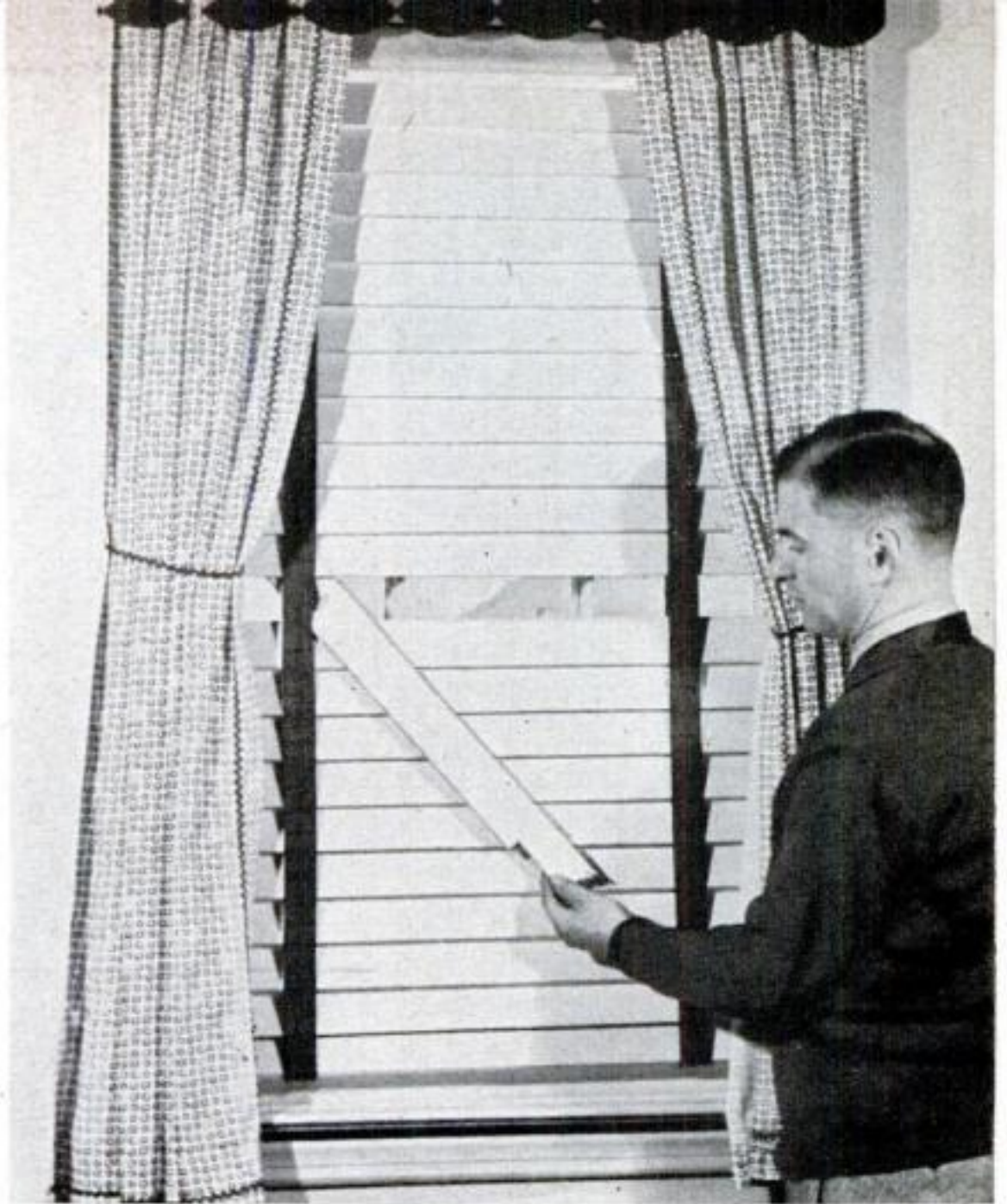
Stop a minute before you phone the repairman. A replacement slat costs very little and installing it is almost as easy as slipping a new blade in your razor.

Here's how:

Turn up the bottom bar. You'll see that the ends of the tapes are held by staples or tacks. Pry them out. Then you'll find that the ends of the cords are knotted and that the knots fit in counterbored holes. Untie the knots and remove the bottom bar.

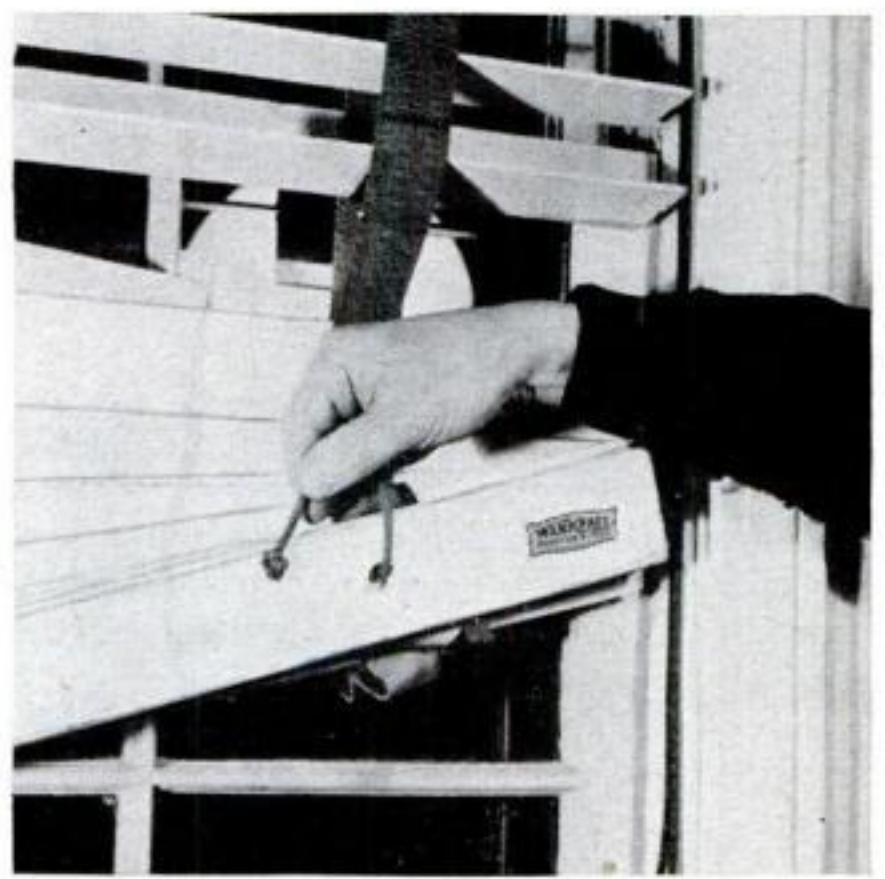


To get to ends of cords that control raising and lowering of blind, pry out tacks holding ends of tapes to underside of bottom bar.

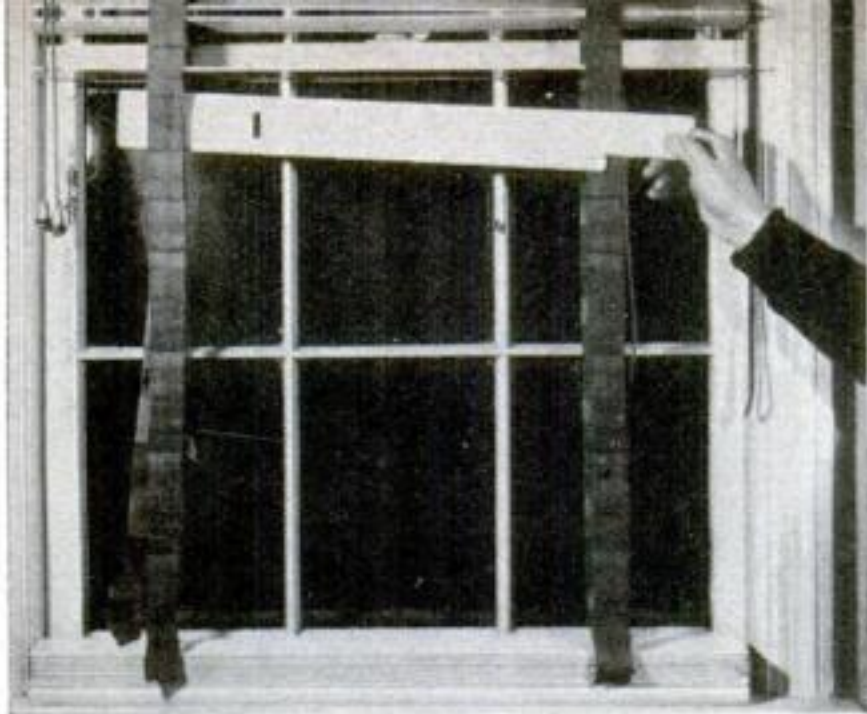


Caught when the window was closed hurriedly, this center slat was snapped off, but damage isn't as bad as it looks.

Reach up between the top bar and the top slat and pull the cords up out of the slots in the slats. Now you can pull the slats off the crosspieces of the tapes. Take out the top slat and put it in place of the broken one. Slip the new slat in place at the very



With tapes loosened, knotted ends of cord are accessible. Pull out cords and untie knots. Bottom bar then can be slipped off cords.



After cords are pulled up through slots in slats, broken one can be removed. While cords are out, all slats can be taken out and cleaned.

Reassembled blind (left) is good as new. Actual disassembly and reassembly of the 22 slats in this blind took only 15 minutes.

top. If its color doesn't quite match the color of the older slats, the new one will be much less noticeable at the top than anywhere else.

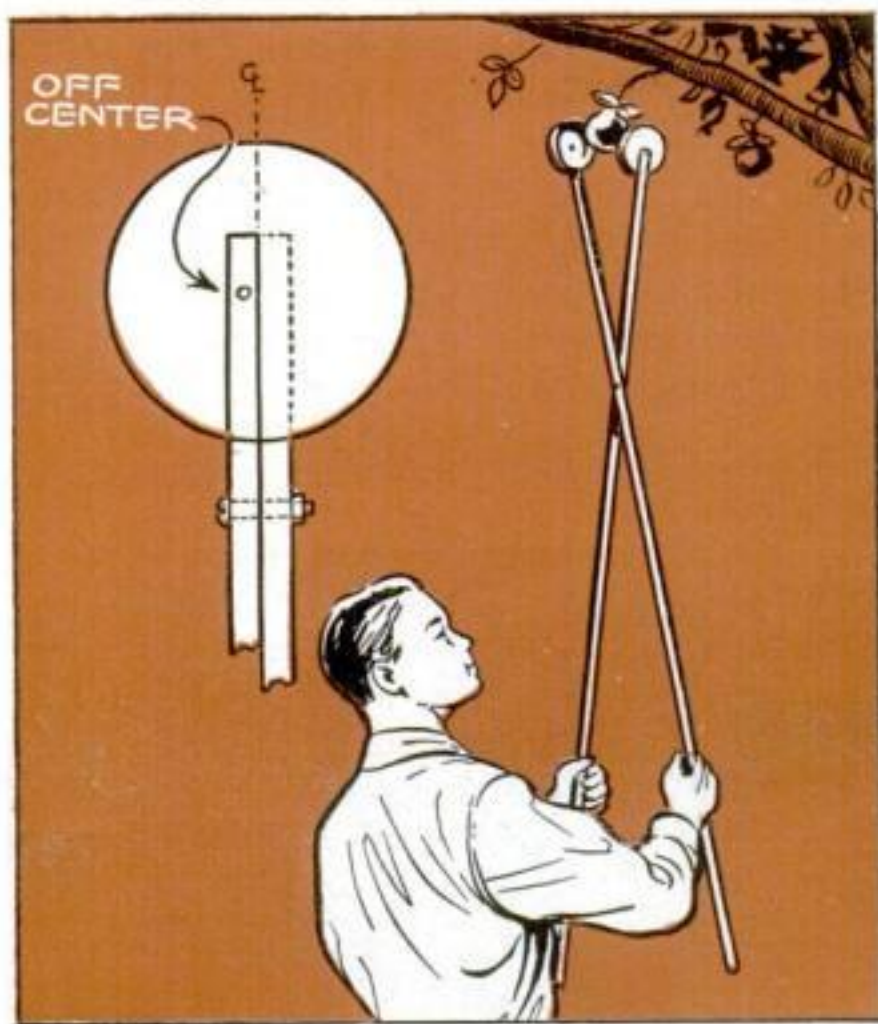
While you have the blind disassembled, it might be a good idea to take out all the slats and clean and wax them. This job is much easier to do with the slats lying flat on a table than when they are hanging.

There's a chance that you might not even need a new slat. The tapes of some blinds stretch after they've been hanging a while, causing the bottom bar to scrape the window sill. Replacing the broken slat with one from the bottom and shortening the tapes may actually improve the hanging qualities of the blind.

Now reassemble the cord and tapes and the blind's as good as new.

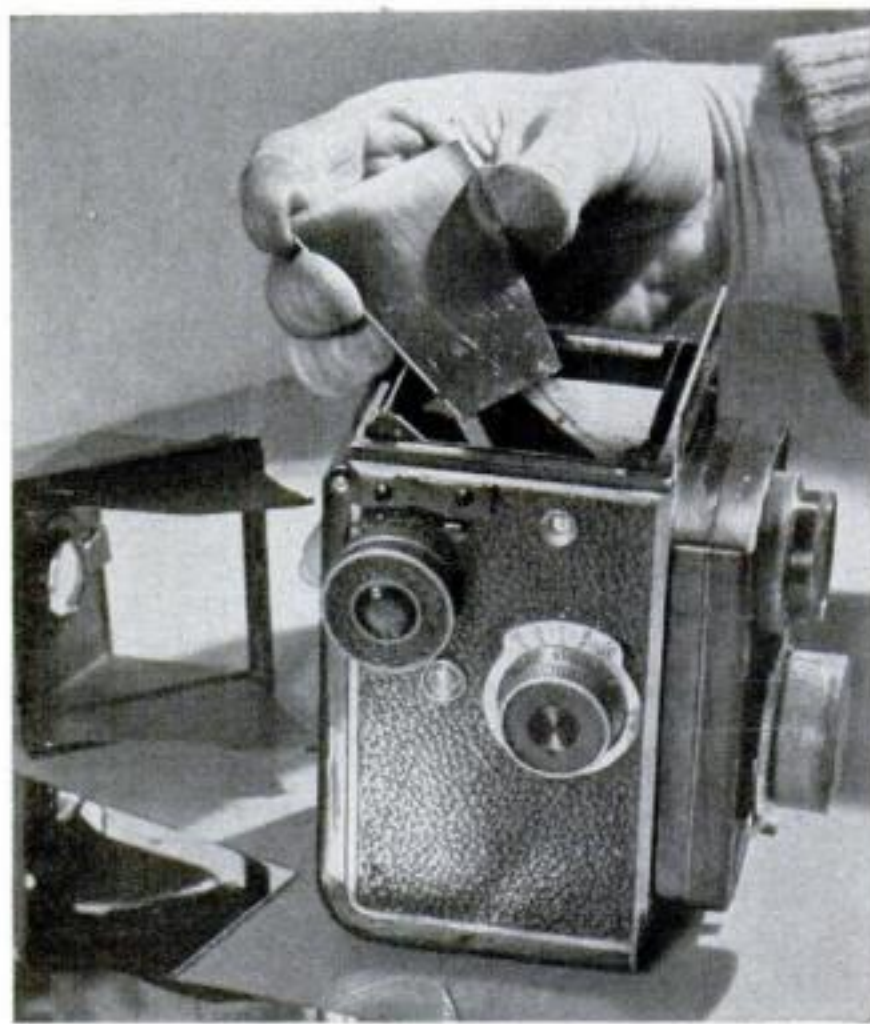
A bent metal slat can be removed in the same way. After you straighten it out, reinsert it in the top position.—*Robert Hertzberg, Jackson Heights, N.Y.*

Jar Caps Make Fruit Picker



You can build a handy, laborsaving fruit picker with a couple of jar caps and scrap wood. Cut the two strips of wood to the length you want them. Join the pieces with a nail, wood screw, or nut and bolt so they can be opened and closed like a pair of pliers. Fasten the two jar lids to the ends of the sticks off center. Then they will line up with each other when the picker is closed.—*A. R. Morgan, Naugatuck, Conn.*

Metal Subs for Broken Mirror



SHOULD the top-surface focusing mirror of a reflex camera become broken or damaged, you can substitute a piece of chromium-plated sheet metal. A chromium ferrotype plate is one possible source. A metal mirror from a shaving kit is another. Cut the metal with a fine-tooth hacksaw or a metal-cutting bandsaw. File the edges smooth. Polish with ferrotype polish before installing.—*Walter E. Burton, Akron, Ohio.*



Hose Unwinds While the Water Runs

By Will Thomas

YOU'LL be the envy of the neighborhood when you have a hose reel like these. Take your pick of one that can be rolled anywhere, or one permanently mounted on the house wall. With either, sprinkling the lawn or garden is no chore at all.

You just pull off as much hose as you want—six feet or sixty—and turn on the faucet. No more wrestling with yards of extra hose when you need only a short length. When you're through, just turn off the water and wind on the hose. You don't have to disconnect it from the faucet.

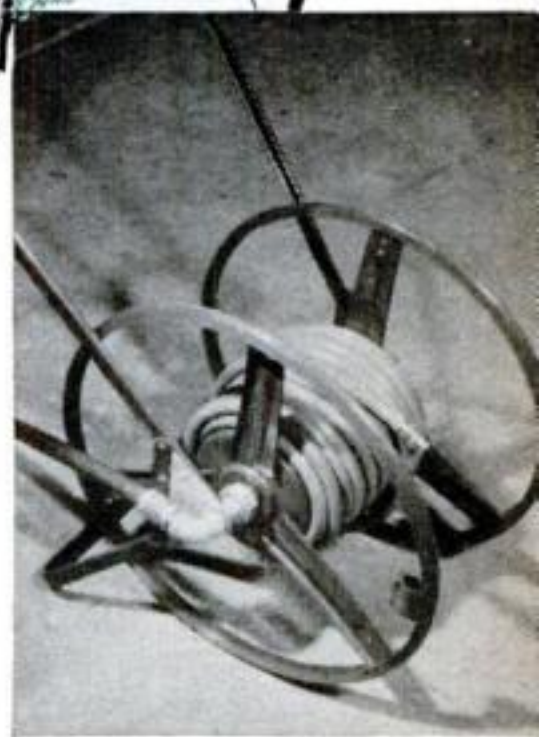
The water goes through a hollow axle and a revolving joint into a hose adapter on the reel. But you don't need a lathe or a course in machining to make these parts. They're assembled from standard pipe and fittings, available at plumbing shops or plumbing supply dealers. The only special tools you're likely to need are a pipe wrench and an 8-32 tap.

Aside from the hose cart, the parts shouldn't cost more than three or four dollars, and you may find some of them in the scrap bin.

Revolving joint. This would be a tough problem if there weren't a ready-made answer for it—a standard $\frac{1}{2}$ " union. Get one of good quality. See that the seat is smooth and without flaws. Drill a hole in the coupling nut and tap it 8-32 to receive a setscrew, preferably the Allen type. Then lubricate the inside with graphite or auto water-pump grease, and assemble the union just tight enough so that it turns rather stiffly. Tighten the setscrew well.



Turn on the water and walk away with the hose—as much or as little as needed. Reel on house wall (above) is always ready to use. At right is a similarly converted standard hose cart.



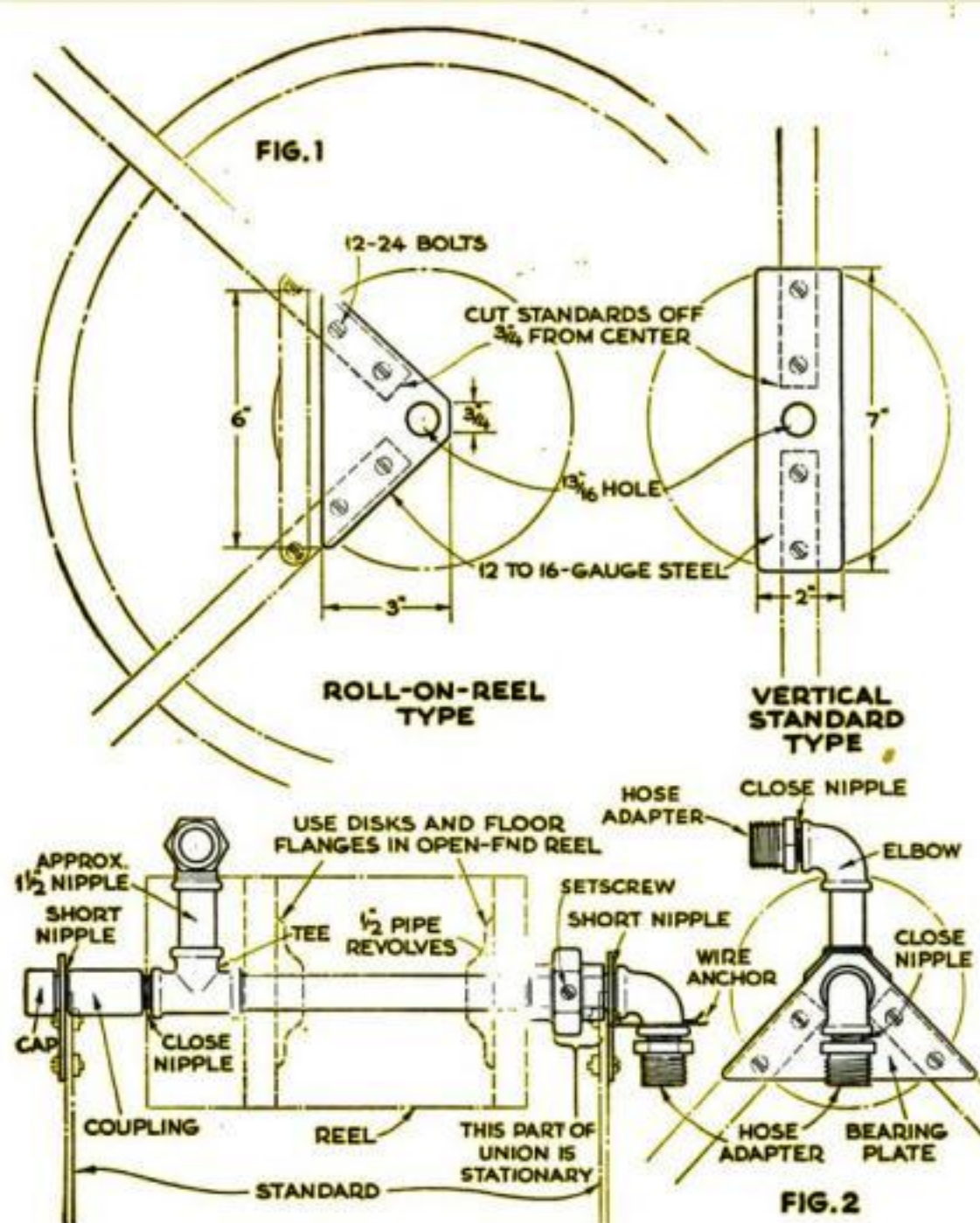
The union may drip a little at first. After it has worn in a bit, it can be readjusted and should hold water unless subjected to extreme pressure.

Hose-cart reel. You can make this from a cart that rolls on its rims, as shown, or one with a reel mounted between two uprights to which wheels are attached.

First disassemble the hose cart completely. Since the frame members probably will be too narrow to make bearings for $\frac{1}{2}$ " pipe, you may have to hacksaw a couple of bearing plates out of light steel (Fig. 1).

Figure 2 shows how the water-carrying axle is mounted in a reel with closed ends. The existing holes are simply opened out with a round file to take $\frac{1}{2}$ " pipe. A hole is made in the surface of the reel for the elbow bearing the hose adapter.

If the reel has open ends, with bearing members too small to be opened out for



Frame members of your hose cart may be too small to drill out as bearings for $\frac{1}{2}$ " pipe. If so, cut them a trifle short instead. Mount simple triangular bearing plates with bolts and nuts.



Water-carrying axle unit is first trial-assembled. Longer nipples or an extra coupling may be used as spacers to suit hose-cart and reel dimensions. Use red lead on all joints.

Mounting of closed reel. Dotted parts are for an open reel.

$\frac{1}{2}$ " pipe, cut them out. Substitute wooden disks and floor-flange bearings, as in Fig. 2.

Cut and thread the long axle pipe to the length required for a good fit in the frame. Assemble all pipe parts loosely at first to

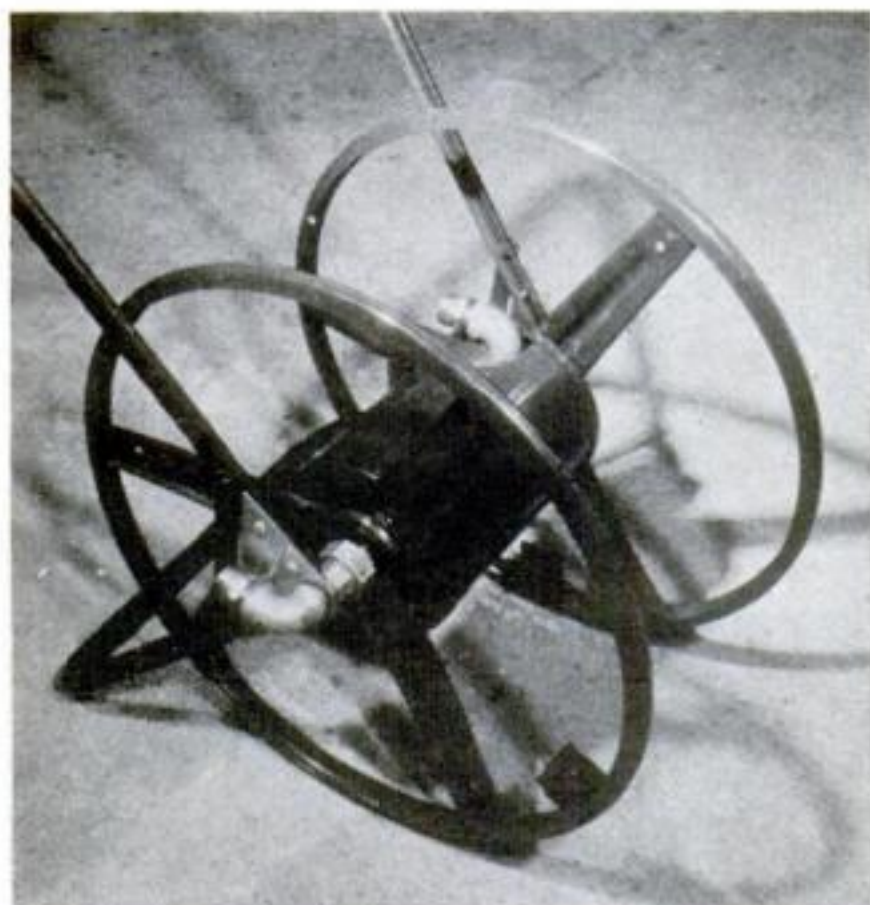
make sure they fit. In Fig. 2, a coupling is shown at the outer end to space the reel away from the frame. If this isn't needed, use only the parts in the photo. It's best to assemble the reel, water fittings, and bearing plates as a unit and then bolt the whole to the frame. Seal all pipe joints with red lead before tightening them.

Use a piece of heavy wire or a simple bracket to anchor the outer elbow to the cart frame so that it can't turn. The hose adapters have $\frac{1}{2}$ " pipe thread at one end and standard $\frac{3}{8}$ "-14 hose thread at the other end. Most well-stocked hardware and plumbing shops carry them.

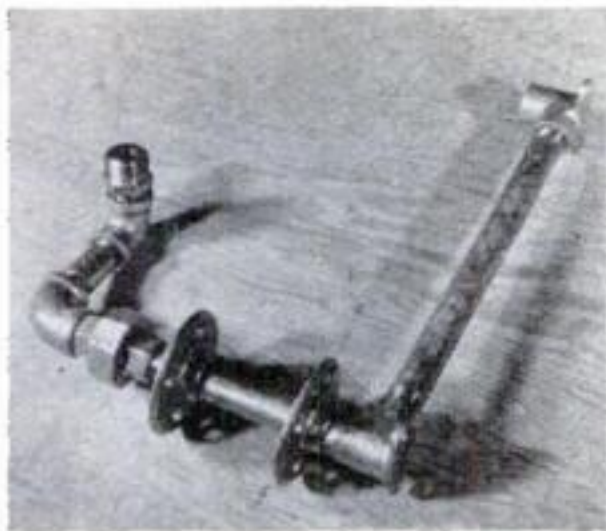
Wall-mounted reel. Although not portable, this one takes up less space and is never in the way. It's built around a one-gallon paint can. Cut out the bottom with a rotary can opener and heat the soldered handle lugs to pull them off.

Saw two hardwood disks to fit inside the can as closely as possible, and bore a $\frac{3}{8}$ " hole in the center of each disk. Then file out two $\frac{1}{2}$ " floor flanges to a running fit on $\frac{1}{2}$ " pipe, and mount the flanges on the disks with wood screws.

Cut a hole near the flanged end of the can for the hose connection. Saw out two



Ready for use, the hose cart will hold 100' of standard $\frac{3}{8}$ " hose. Once rolled where you want it, it's turned over on its back, handle on the ground, so the reel is free to turn.



Trial assembly of vital parts of the wall-mounted reel. Hardwood disks will be fastened to the two flanges. The long pipe member at right end is attached by lug elbows to the house.

reel sides from $\frac{3}{8}$ " outdoor plywood, $\frac{1}{4}$ " composition board, or stiff sheet metal. If you use sheet metal, have a tinsmith form rolled edges on the pieces.

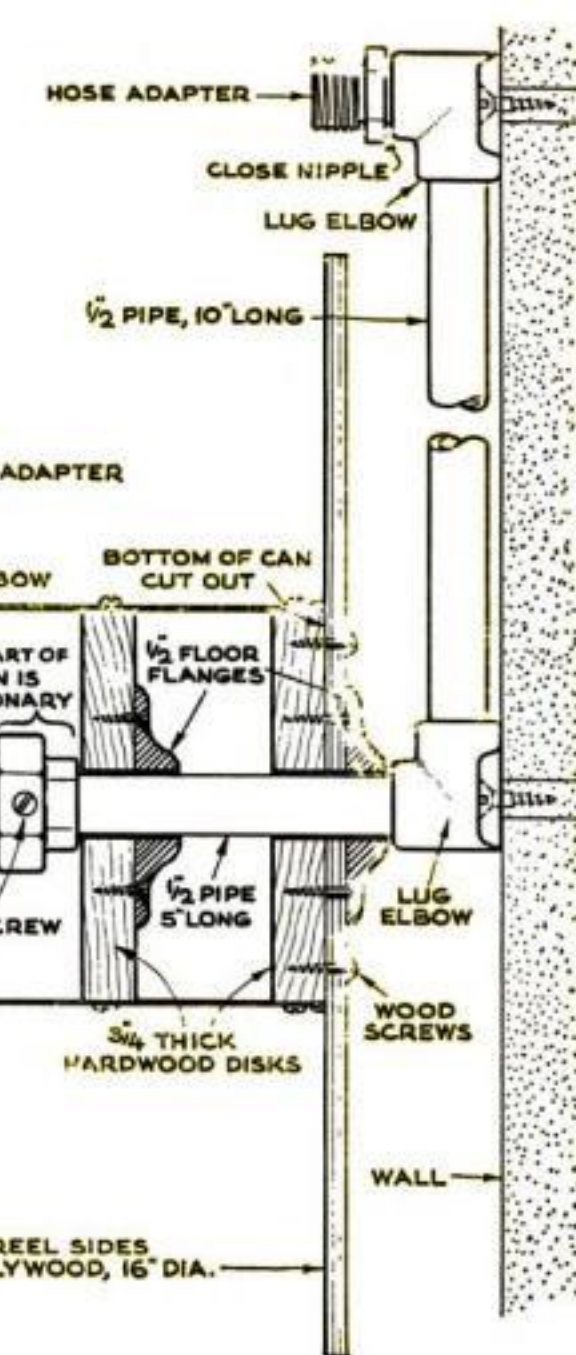
Assemble the inner reel side, end disk, and bearing flange first, using wood screws. Then add the axle pipe with the second disk, union, and inside elbow. Be sure the axle pipe is fully and cleanly threaded where it screws into the lug elbow, as it carries the whole weight of the reel.

Now slide on the can, fastening it to the two wooden disks with short wood screws. Screw in the 2" nipple with the upper elbow and hose adapter, and adjust the union. Then attach the outer reel side with self-tapping screws going through the can flange. If you prefer, you can solder nuts inside the flange and use bolts. You'll want this reel side detachable to adjust the union.



Axle unit, can, and inner reel side are assembled as at left. The outer reel side is made detachable for adjustment of the union. Finished reel, right, must be partly disassembled for mounting on house.

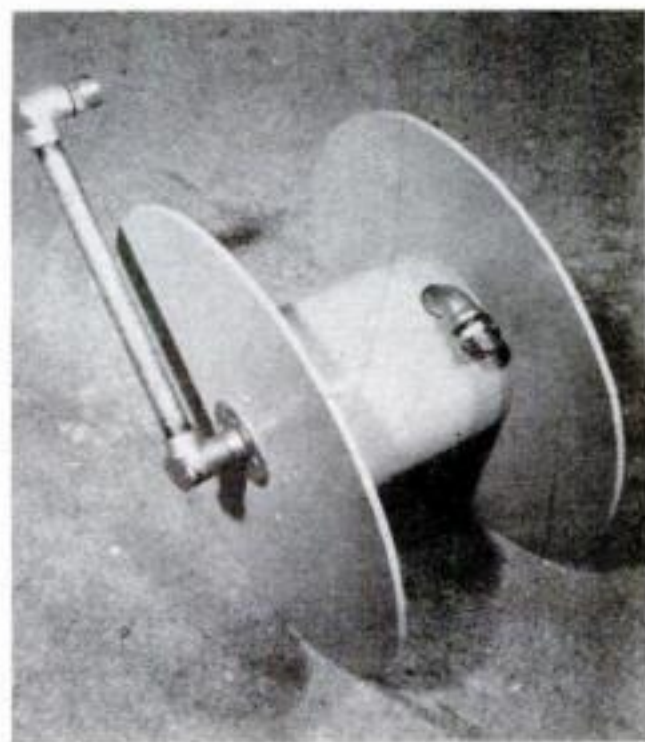
Lug elbows and the pipe between them are mounted separately. Use husky wood screws on a wooden wall or trim, or bolts and suitable anchors in masonry. Screw on axle and reel and adjust the union.

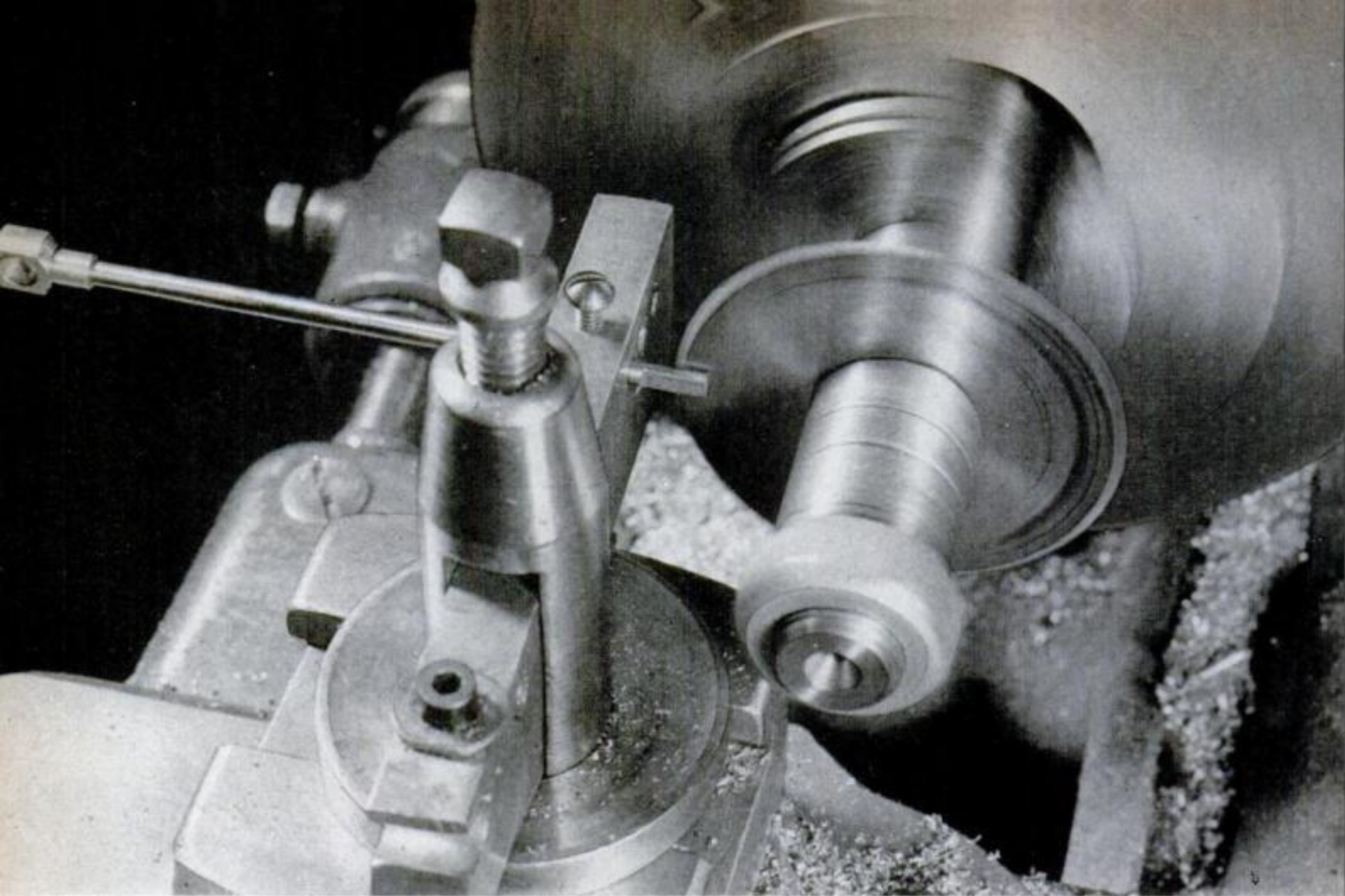


Wall-mounted reel has wood sides. It too holds a 100' hose.

Give all parts at least two coats of a good house paint or enamel, including the inside of the can. A few drain holes punched around the can near the flange—or better still, at both ends—will prevent water from accumulating inside.

Mount the unit on the house wall, a couple of feet from the faucet, by heavy wood screws or masonry bolts through the pierced bosses of the lug elbows. Connect the outer hose adapter to the faucet with a short length of hose. **END**





How to mill flats that *are* flat. Work held in the bar is aligned against side of slitting saw;

then the bar is clamped. Similar setup splits rods, mills squares and hexes, and cuts slots.

Quick Milling Setups for Your Lathe

By Joseph Tracy

DO YOU still do all your small shaping jobs with the "Arm-strong milling machine"—also called the file? Even if you're really sharp, hand filing can't touch milling for accuracy in forming flats, grooves, radiuses, and angles.

If you have a lathe, there's your milling machine. No dough for a milling attachment? Look at the setups shown here. Then take another gander at the job you want

to do, roll out your ingenuity, and go to it.

These simple rigs don't provide vertical travel, but you can do a lot with the horizontal feed of cross and compound slides. Often the "impossible" job can be milled simply by turning it around. Remember to use the back gears to get low spindle speeds, and to feed work against—not with—cutter rotation.

Homemade arbors for milling cutters can be held in the three-jaw chuck, or turned with a taper to fit into the spindle. Some cutters, like the end mill in the photos, have their own taper shank. Be sure tapers are really clean. If they tend to slip under cuts, wiping off the oil film with cleaning fluid may help. Of course a draw-in collet especially made for milling cutters is tops.

To minimize chatter, pull up the gibs of the cross and compound slides tighter than for turning. If either slide won't be moved in milling, tighten it enough to lock it. Check the saddle gibs under the ways too.

Tool-post bar. How often have you settled for an unreasonable facsimile of a slot in a thin rod, or put up with a rounded surface where you wanted a flat? The jig shown at the top of this page, devised by

Floyd McGuckin, of Ridgewood, N. J., is so simple there's no excuse for doing without it. A natural for modelmakers and others who do small machining jobs, it'll split shafts, slit screws, form square or hex ends, and produce tailor-made flats in no time. Unlike most substitute setups, it takes only minutes to make and rig on the lathe.

Aside from an arbor for the cutter, you need only a rectangular bar that fits into the tool post. Drill holes through this bar at lathe center height to suit the stock to be milled. Hold unthreaded rods with set-screws. For screws or parts with a threaded end, tap the hole in the bar to match.

As the drawing shows, you can also drill several holes, make a saw cut across them, and use a pinch screw to clamp rods.

Where a slot is to be centered in the piece, it's a good idea to face off the work first, leaving a little pip or stub just equal in diameter to the width of the cutter. Then it's easy to center the slitting saw on this.

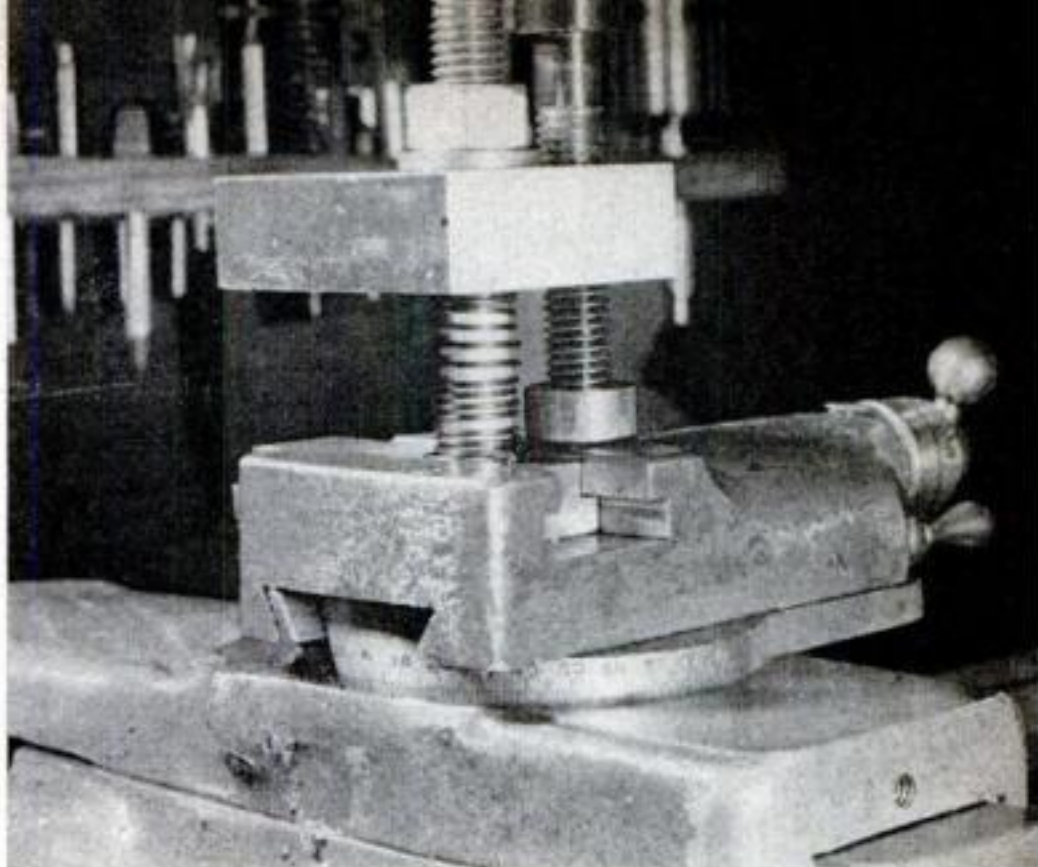
Milling vise. This is a plate of $\frac{1}{2}$ " steel free to slide on a stud, which is threaded into a shoe that fits the T slot of the compound. A second hole in the plate is tapped for a $\frac{1}{2}$ " cap screw. You can use a protective pad under this, or fit it with a swivel foot to avoid marring the compound.

Make the shoe almost as long as the T slot, shaping it with hacksaw and file. If the rabbeted edges aren't as clean as you'd like, your first job with the vise can be to mill a better shoe.

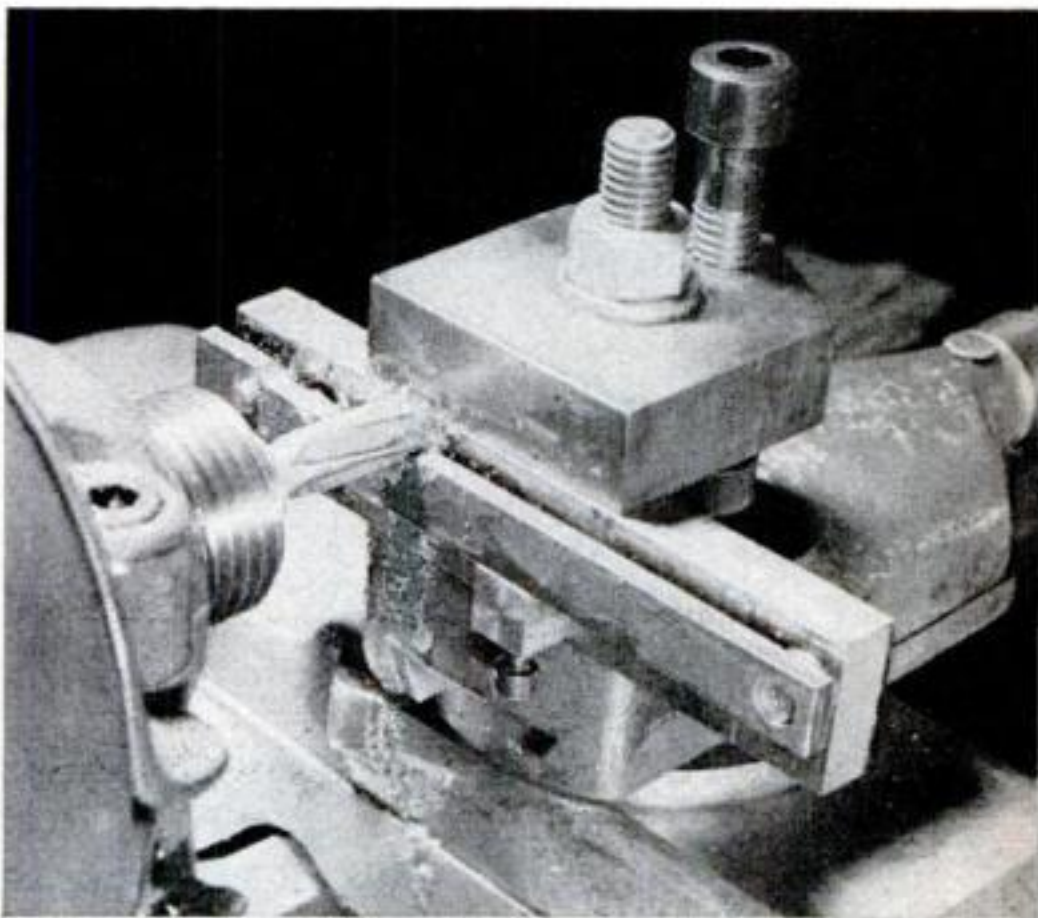
After the nut has been turned down to hold the work, the cap screw is tightened to clamp it. The height of the work (and so the location of the cut) is controlled by putting shims or packing under it.

Bar-milling fixture. Typical of the tougher jobs is milling the mid portion of a bar narrower than the ends, as in making connecting rods for a model locomotive. One photo shows this being done with a special fixture held in the milling vise. The bar, drilled at both ends to suit the crank-pins, is placed on matching pins set into the fixture. For rigidity, the bar is supported midway by a screw, as shown in a drawing. The cut is begun by moving the bar against the end mill with the longitudinal feed of the lathe; then the work is traversed with the cross feed.

Forming end radius. To mill a true radius on the end of a bar, turn a short pin on the head of a big cap screw. Clamp a piece of $\frac{1}{2}$ " plate in the milling vise and run

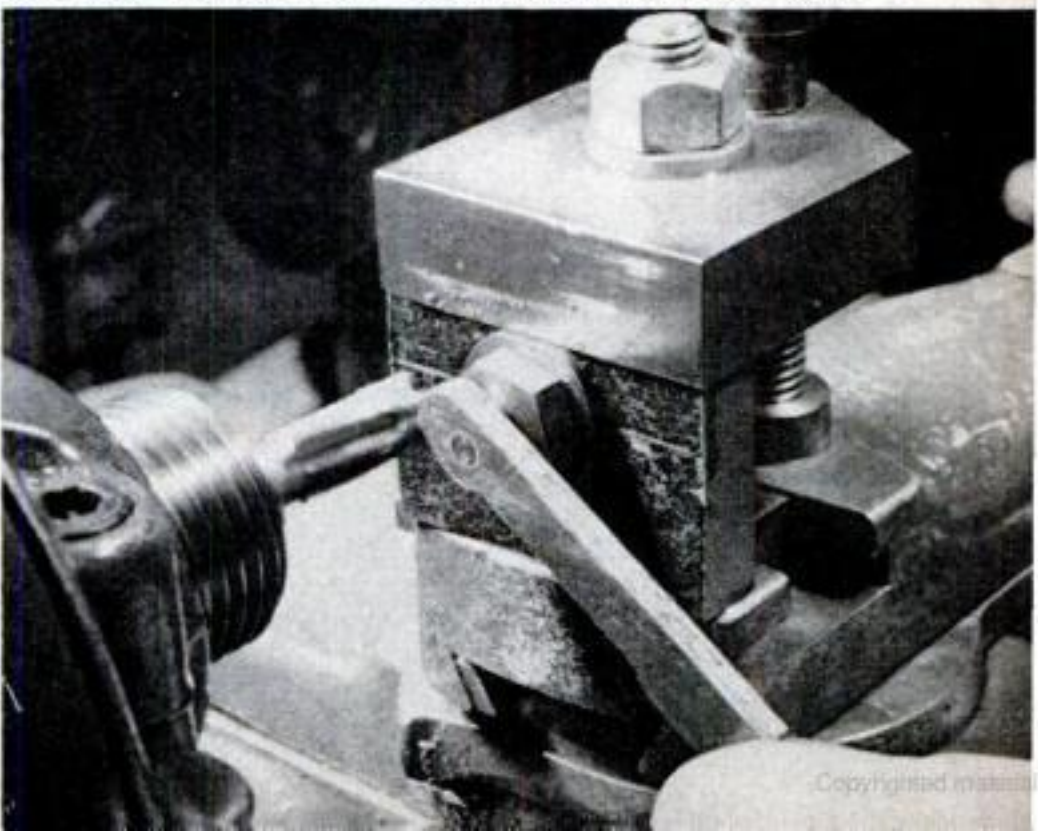


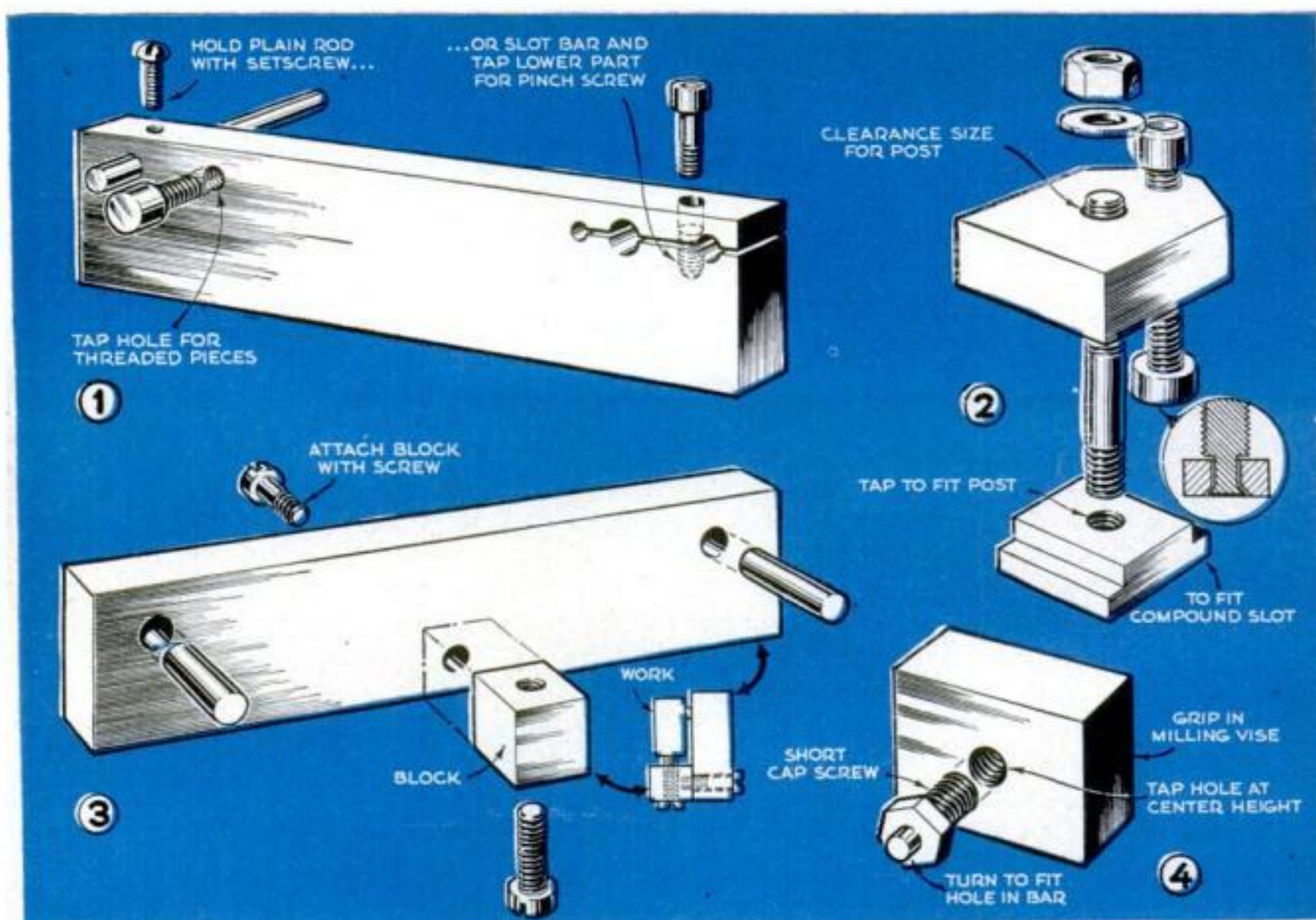
Simple milling vise locks into T slot. The spring on the center post holds up the top plate for easy insertion of work. Tightening rear bolt clamps work between plate and slide.



Milling a connecting rod for a model locomotive. Here a left-hand end mill is being used, with the lathe running backward. Work is therefore fed forward, against rotation.

By swinging a bar on a pin against a cutter you can mill a true, clean radius on the end.





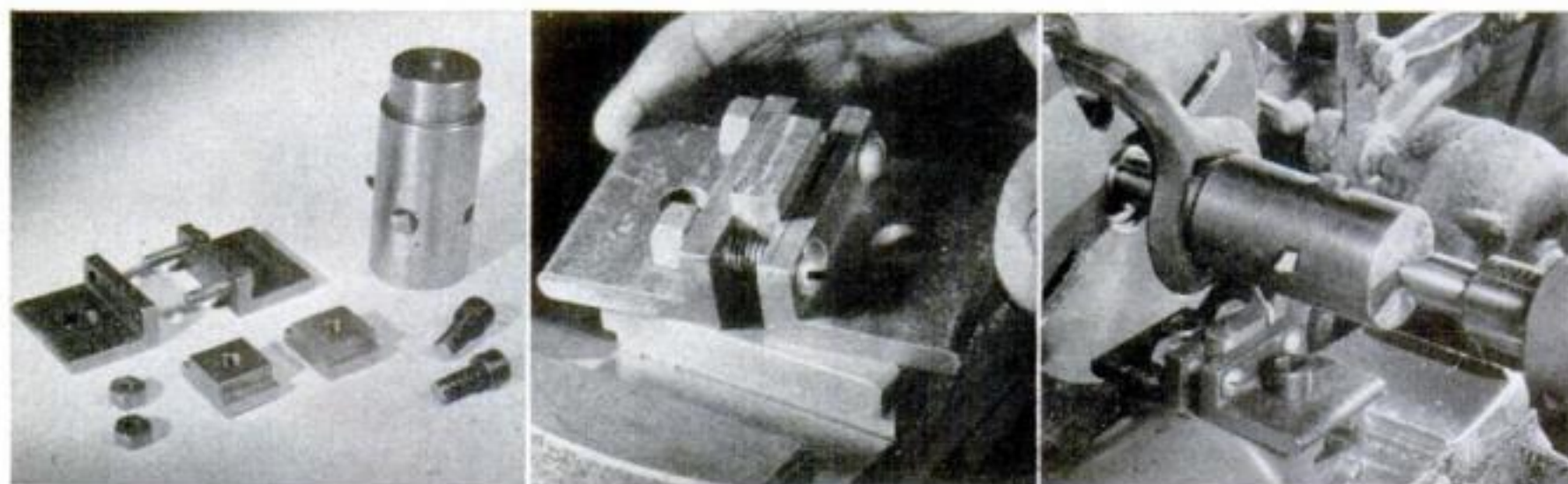
it up against a drill chucked in the headstock. Tap the resulting hole to match the bolt and turn the latter in tightly.

With the bar on the turned pin, advance the cross feed just enough to nick the corners. Swing the opposite end of the bar to work against cutter rotation. Advance the cross feed slightly for the next cut, and so on. For larger pieces, thread the pin and hold the work on with a nut.

Simple milling clamp. Quickly made from a couple of pieces of angle, the little clamp in the photos below does many small jobs well. Its capacity is limited, of course,

by the distance from the top of the compound to lathe center height. The angles need not be machined for ordinary work. For greater precision, the outer surfaces can be faced square in the four-jaw chuck. Two shoes are required. Work is clamped with bolts and nuts between the two angle members at the desired height, and the whole is then mounted on the compound.

Milling with fly cutter. Although end mills, keyway cutters, and small slitting saws can be used with the setups described, the fly cutter shown in a photo below has a big advantage over these: Its single cutting



Milling clamp is held in T slot by two shoes so that jaws can spread for work of various widths. In milling with a fly cutter (right above) the lathe carriage is locked in place.

With bit turned as shown, lathe must run forward. Work must be run under it and fed into cutter from the rear, toward operator. Take light cuts to avoid chatter and poor finish.

edge can easily be ground to special widths and shapes. Centerdrill a suitable bar, shouldering down one end to fit a driving dog if necessary. Drill and file a square hole on the diameter for the tool bit, and tap one at right angles to this for a setscrew to hold the bit.

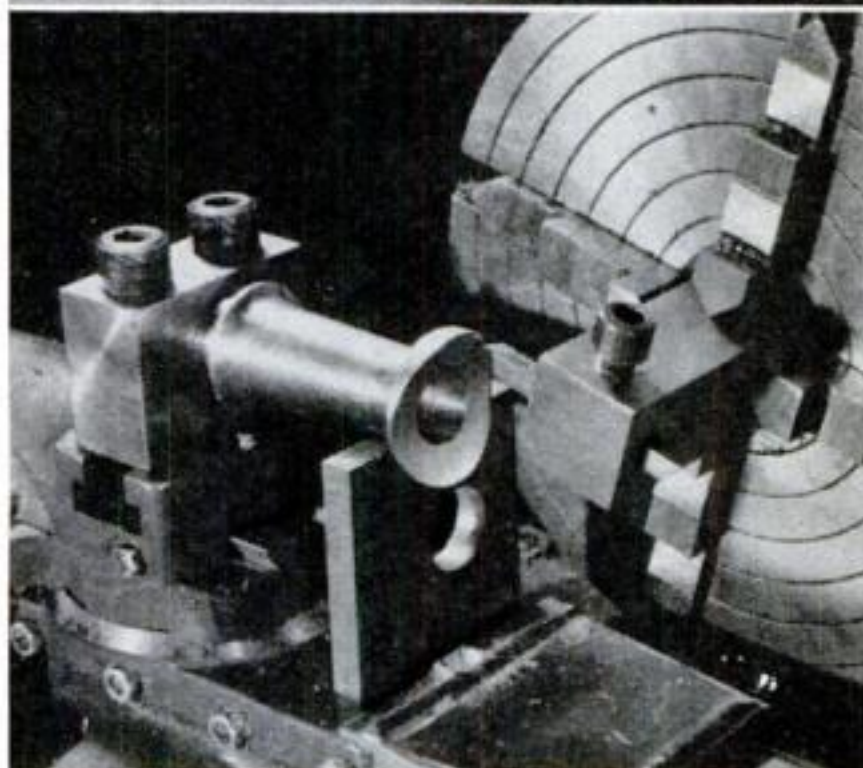
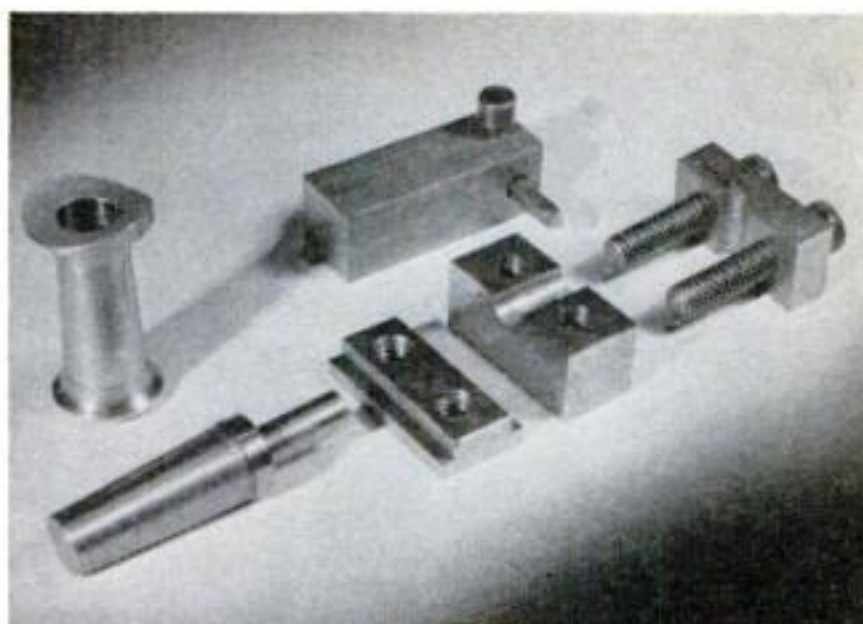
Milling big radius. A fly cutter is also useful for milling comparatively large radii. The photo at right shows how a stack for a model locomotive was milled at the bottom to the radius of the boiler.

The material was first taper bored. A taper arbor was next turned and the piece driven on this for turning the outside. The same arbor was then mounted on the compound in a boring-bar block, the hole in the block being at center height. Because of the considerable overhang of the work, it was supported at the outer end with a block wedged between it and the top of the cross slide.

A rectangular steel bar carried the fly cutter, its flat faces giving positive drive in the four-jaw chuck. The cutter can be set to the desired radius in the bar, or the bar itself can be adjusted by moving the chuck jaws.

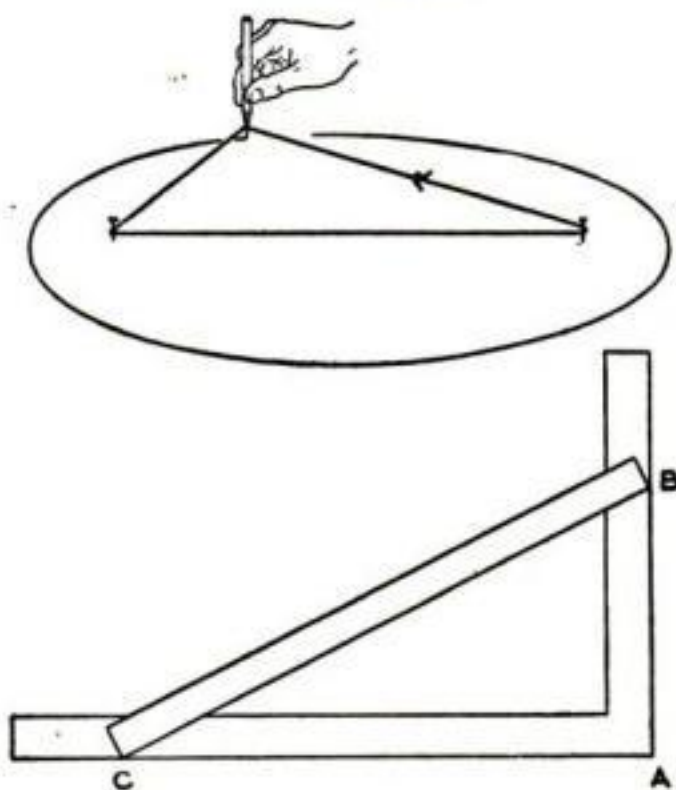
In milling with such a setup, take care to set the compound exactly at 90° to the ways, or the radius won't be square to the work axis. Advance the work into the cutter with the cross feed. Make the pass with longitudinal feed.

END



A square fly-cutter block chucked in the four-jaw can be set to swing a desired radius by adjusting the chuck jaws. Note support block under end being milled. The finished job is a stack for a model locomotive. Taper arbor (left foreground at top) fits into the boring-bar mount shown disassembled behind it.

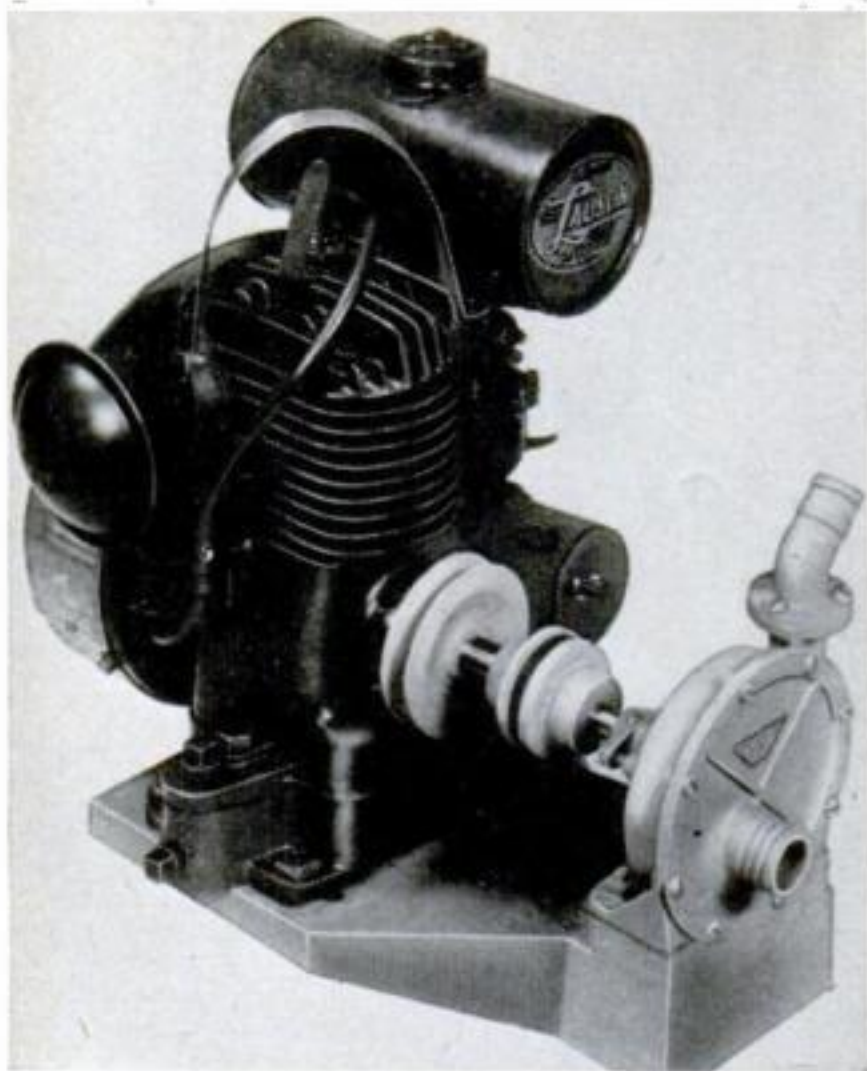
ELLIPSES



THE method of drawing a perfect ellipse with a pencil and a loop of string placed around two brads or thumbtacks, as shown in the diagram at the left, is frequently used in laying out work. An easy way to find the proper spacing between the brads and the correct length of string to be used is as follows:

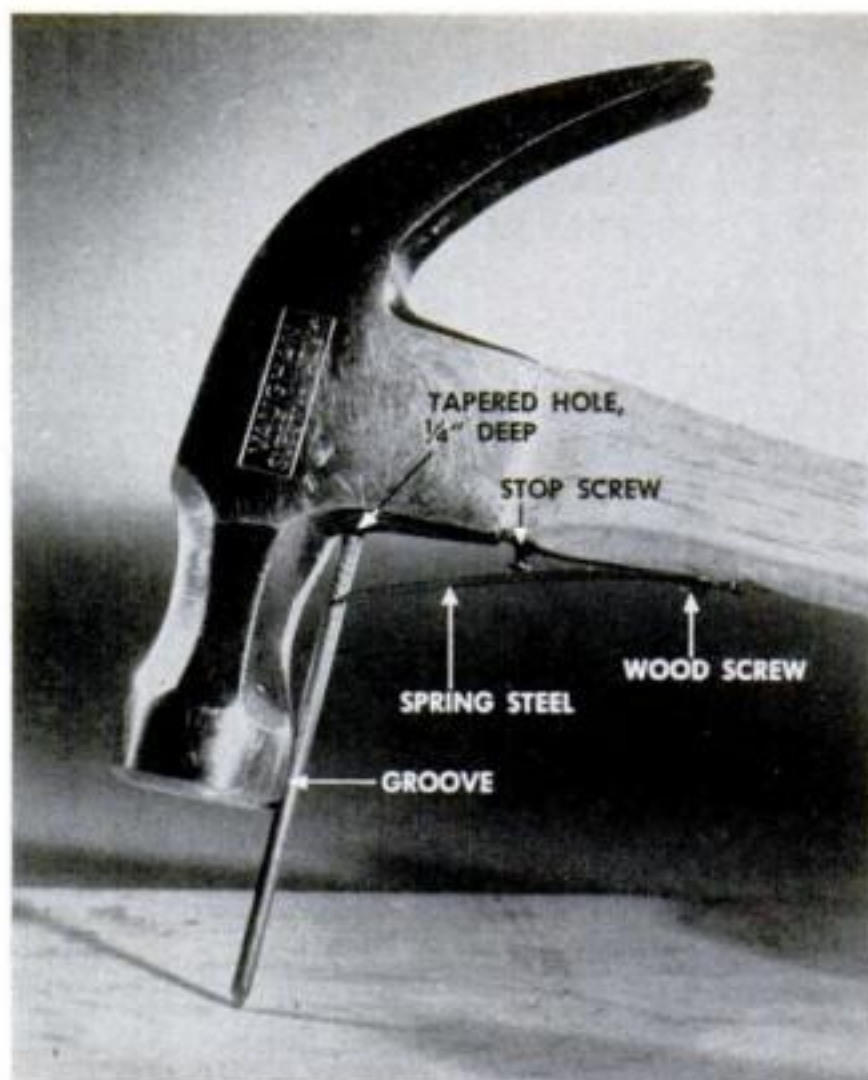
Measure the breadth of the desired ellipse on one leg of a steel square, or any other right angle. This breadth is AB on the diagram. Now measure off the length of the ellipse from B to the intersection at the other leg of the square— BC on the diagram. The distance AC laid off on the leg of the square is the correct distance between the two brads. The sum of the distance AC and the length BC is the proper length of string in the loop.

FOR YOUR POPULAR SCIENCE INFORMATION FILE



Midget Pump Packs Power

PORTABLE, and weighing only 26 pounds, the Little Gusher gives big-pump performance. In tests conducted by the manufacturer, L.R.H. Labaw & Co., of Belle Mead, N. J., it has pumped 2,000 gallons an hour to a height of 25 feet, or 360 gallons an hour, 75 feet. The $\frac{3}{4}$ -hp. gas engine has a power take-off that makes the unit handy for running farm and garden equipment.



Hammer Holds Nails

AT TIMES every carpenter finds he has an awkward stretch to start a nail, or difficulty where both his hands can't reach to hold the nail and hammer, too. Putting the nail in the claws to start it works sometimes.

I found it better, however, to alter my hammer as shown in the photo. The spring holds the nail securely until the first blow starts it. Then it's easy to pull the hammer away from the nail and drive it home.—A. F. Hendricks, N. D.

Shoptalk:



"I'M ABOUT FINISHED
UP THERE—ALL EXCEPT
PUTTING THE CRICKET
ON THE CHIMNEY."

What are they talking about?
Where do they work? Answer below.

They're roofers. A cricket is a special flashing for chimneys. Regular flashing strips are all right on three sides of a chimney. But on a sloping roof, the side of the chimney nearest the ridge must be fitted with a cricket. It's V shaped and sheds water to each side of the chimney.

How to Flash Two Photos Fast

WHEN you must shoot a couple of photos in quick succession—taking candid shots of a wedding, for instance—it helps to be able to flash twice without stopping to insert bulbs. You can do this by clamping an extension flash unit to the battery case of the master unit. Wire them in parallel through a toggle switch. On the "off" position, only the master flash will go.

When this bulb is dead, flipping the switch makes the second one ready.—Robert Chambers, Knightstown, Ind.





Students entering this school are handed saws on the first day and told to start using them.

Manual Training for Housewives

By Robert Hertzberg

NO DOUBT about it: household maintenance is no longer the husband's responsibility exclusively. It has become a joint activity, with the wife gradually assum-

ing even more than half the share. After all, she has to contend with leaky faucets and blown fuses all seven days of the week, not just one or two.

But most women are totally unprepared for this mechanical work around a house,

Tying the springs of a chair is less complicated than knitting a sweater, these women find. Repairing upholstery is a popular subject.

How do you patch holes and cracks in plaster? This woman (being shown how to hold a trowel) will learn by repairing a make-believe wall.





Old paint is removed and new finish is applied to scrap wood in schoolroom. These women will refinish furniture later on.



This woman is learning how to improvise gluing clamps from pieces of sash cord and bits of wood, if necessary, to repair her kitchen stool when it threatens to come apart.

however willing and enthusiastic they may be about doing it.

"With no training, how can we accomplish anything as assistant 'handymen'?" two New York City housewives, Mrs. Grace K. Liebman and Mrs. Lillian Baldwin, asked



Dripping faucets are repeatedly "cured" at a big practice sink by students in the beginners course in reducing the plumber's bills.

Clogged drains are cleared, too. Most pupils rush right home to apply this new knowledge to stubborn fixtures in their own kitchens.



themselves. So they decided they would learn by going back to school. This sounded simple, but it wasn't. When they inquired at private and public schools, they found the courses in carpentry, painting, plumbing, and allied subjects were too specialized and too long.

"Why not start our own school?" they decided finally. "Only it will be a workshop rather than a school, where housewives like ourselves can be taught how to cope with everyday home problems."

News of their plans spread rapidly. Even women they did not know called Mrs. Liebman and Mrs. Baldwin.

"Count me in!" said one. "I'm being driven crazy by a clogged drain in my kitchen."

"Will someone show me how to patch some horrible nail holes in my living room wall?" inquired another.

With the encouragement and backing of their husbands, the two promoters rented a large loft over a movie theatre at Broadway and 66th Street. Then they visited the industrial-arts department of a local university and arranged for the spare-time services of several licensed teachers of general shopwork. With the advice and assistance of these experts they bought tools and supplies and had the loft fitted with benches, plumbing, wiring, etc. Starting from scratch, with only an idea and an empty room, they had spent about \$1,000 by the time they were ready for business last spring.

Called the "Know How Workshop," the new school caught on quickly. In fact, at



Electrical repairs are taught at this bench, which has a series of outlets and an abundant supply of appliances to be taken apart and put

together again. Cutaway drawings are posted above the bench. Woman nearest instructor is Mrs. Lillian Baldwin, co-owner of the school.

the beginning Mrs. Liebman and Mrs. Baldwin were so busy handling inquiries and visitors that they had to take their own instruction piecemeal. They charge only \$30 for an eighteen-hour, four-and-a-half week course, including the use of all tools and materials, and they figure that they are just about breaking even.

Classes are kept small (eight or nine at the most) so that the instructors can give personal attention to all. There are morning, afternoon, and evening sessions, each two hours long. Teachers assume that the students don't know the difference between a nail set and a hair set, and carefully identify and demonstrate the correct way to use even common hand tools.

"Most of these women have done a lot of sewing or knitting and they have marvelously deft fingers," says one of the instructors. "Once they get the feel of the tools they become very skillful in using them."

A simple lesson on knife sharpening sometimes has profound effects. "I spent ninety-eight cents for an oil stone and fifteen cents

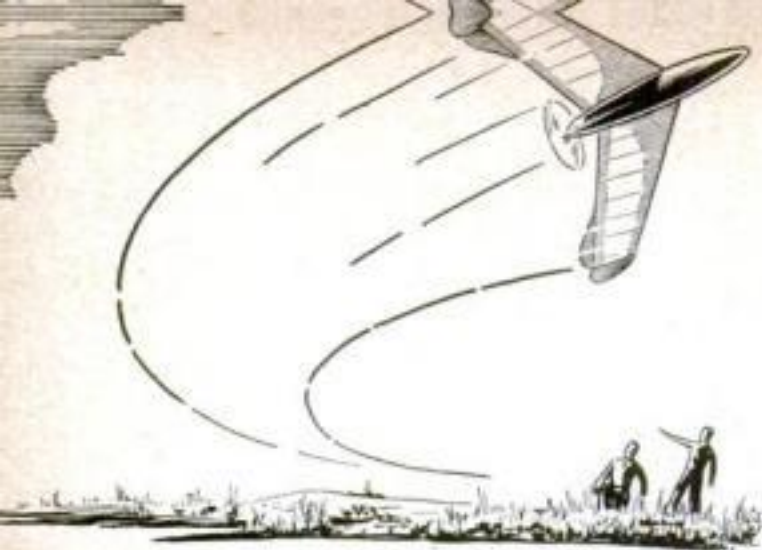
for a can of oil," reported one student, "and touched up three dozen assorted knives that have been used for 15 years. Now my family thinks I am buying better cuts of meat or becoming a better cook, because everything cuts so easily and feels so tender."

Men are not barred, but only one man has enrolled and he soon dropped out. He was a chap who had, as he said, two left hands, and the women were doing so much better he was afraid of getting an inferiority complex.

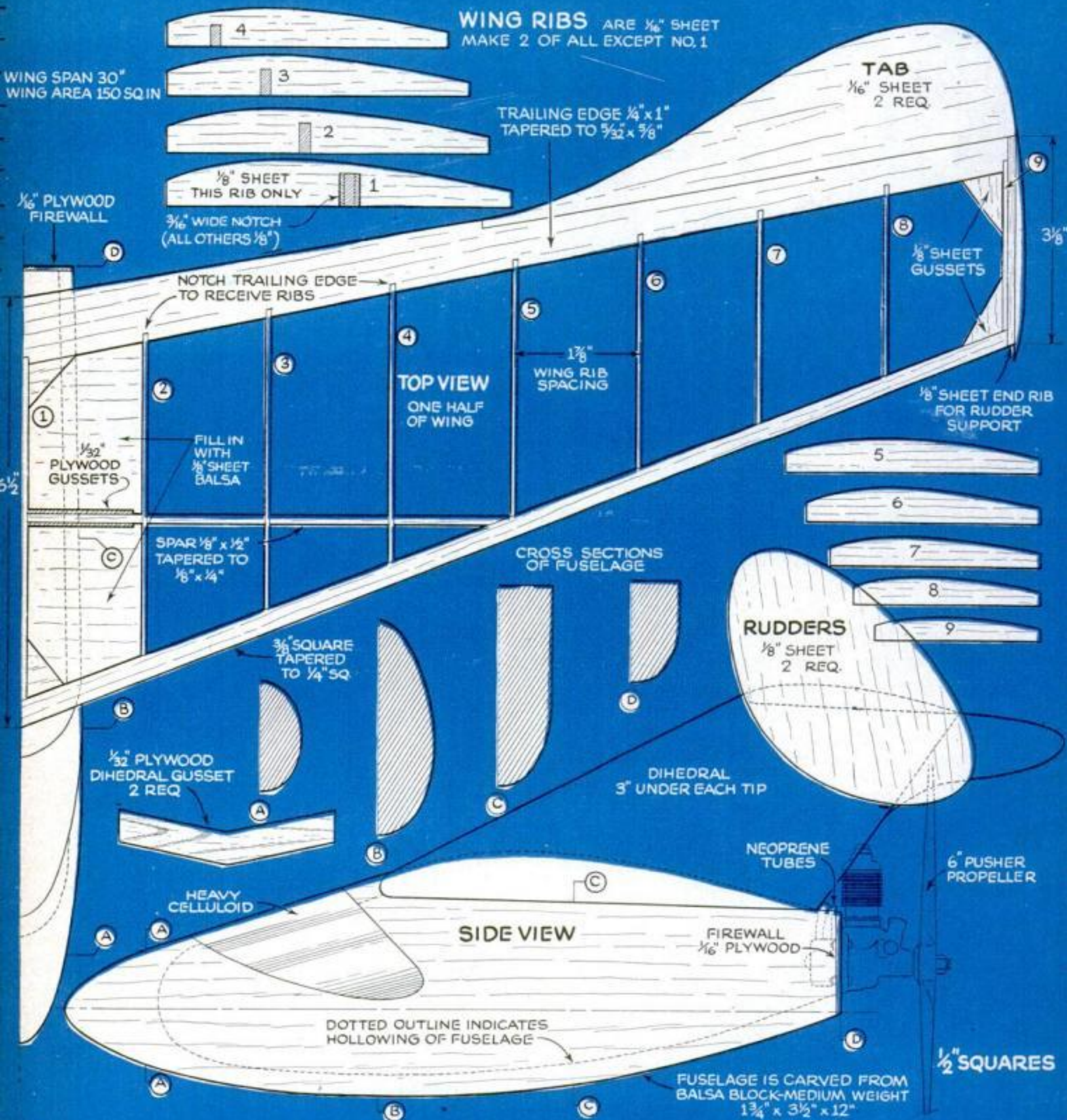
END

Tricks of loosening windows and replacing sash cords that disappear inside the framework are learned on this dummy window casing.





A Flying Wing You Can Build



**Designed for sport flying,
this streamlined pusher model has
speed and plenty of range.**

By Paul Mueller

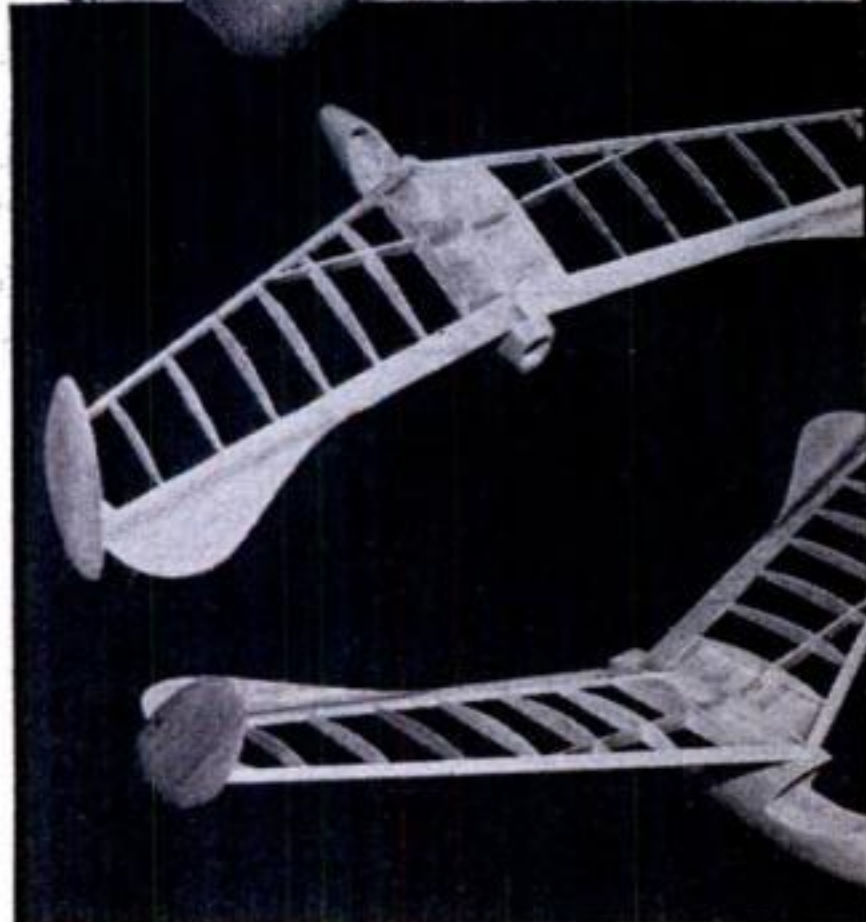
WHEN you get through building this flying wing, you'll have a hot plane to fly. Fast, flat glides, due to its drag-free, streamlined design, may be compensated for by a slight right turn in the rudder. If it shows diving tendencies, bend up the trim tabs. Try it under power. If it tends to loop, warp the tabs down a little. Properly adjusted, your flying wing should climb to the left in a wide circle until the motor cuts, then swing into a right circle glide.

Start construction with the wing. Use the best quality balsa you can get. Lay out the parts from the drawing on the opposite page. You can taper the leading and trailing edges of the wing by planing. The spar—mainly for dihedral bracing—also is tapered by planing. Cut the wing ribs, two of each, from 1/16" sheet balsa, except the No. 1, center rib, which should be made of 1/8" stock. Also cut two 1/8" end ribs shaped like No. 9 ribs, but slightly longer to span the wing edges.

Cut spar notches only in ribs 1 to 4, as shown on the drawing. Notch the trailing edge of the wing so the ribs fit tightly in place. This will avoid warping when the wing is covered. Lay the leading and trailing edges and the spar in place on a flat surface. Cement the ends of the spar to the leading edge. Then cement all the ribs in place except No. 1.

Meanwhile, cut dihedral gussets out of 1/32" plywood to the angle shown. When the wing cement has dried thoroughly, cement the plywood gussets in place to obtain the proper dihedral. Then cement in the center rib, the corner gussets, and the rudder supports, and fill in to rib No. 2 with 1/8" sheet balsa as shown in the photos. Sand the leading edge so it fairs into the airfoil of the ribs and sand the complete wing.

Now you're ready to add the tabs and cover the wing. Run the model-plane tissue with the grain along the span of the wing, spray with water, and let it dry. Apply three coats of clear dope and a coat of fuel proofer.



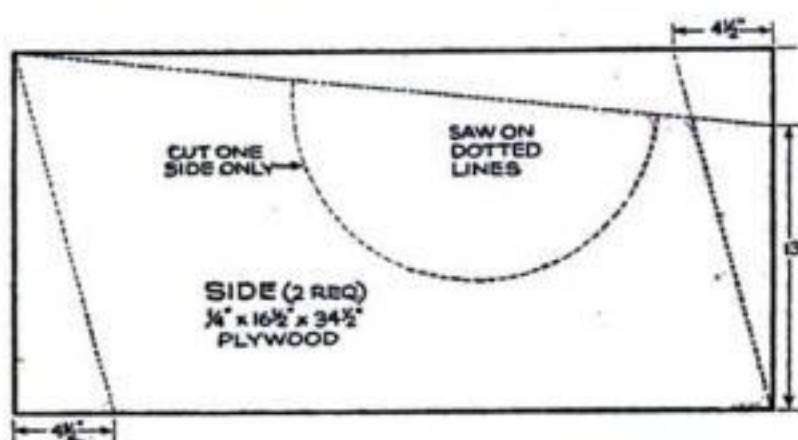
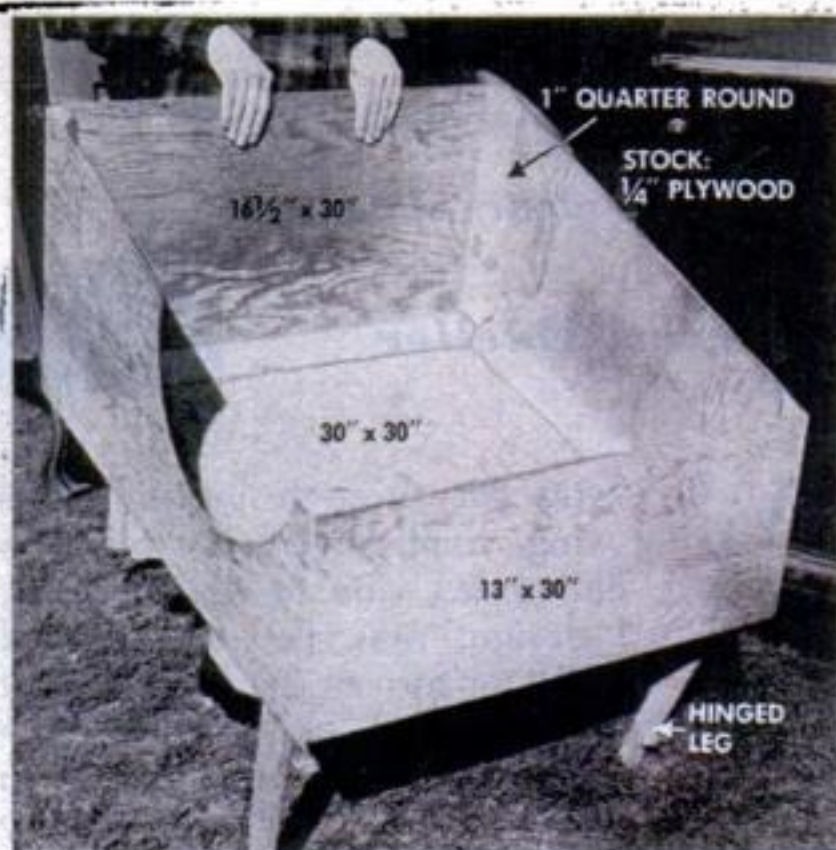
Two views of the plane—before the wing was covered—show construction details. All ribs must fit flush at both leading and trailing edges so that skin will cover the frame smoothly. Note that inside of both rudders is sanded flat, while outer surfaces are curved.

Now for the fuselage. First cut the side outline and top outline. Then round it off. Hollow out the fuselage by gouging or burning. The top and cabin are open, so you can work through these to hollow the interior. Finish the fuselage by fine sanding. Give it two or three coats of a mixture of clear dope and talcum powder, sanding between each coat. This gives a glasslike finish that takes a good paint job. Next cement the wing to the top of the fuselage and the rudders to the wing tips.

For power, a Baby Spitfire or similar engine is bolted to the firewall and cemented to rear of the fuselage. The 6" pusher prop can be bought at most model stores.

END

Back-Seat Box Satisfies Dog



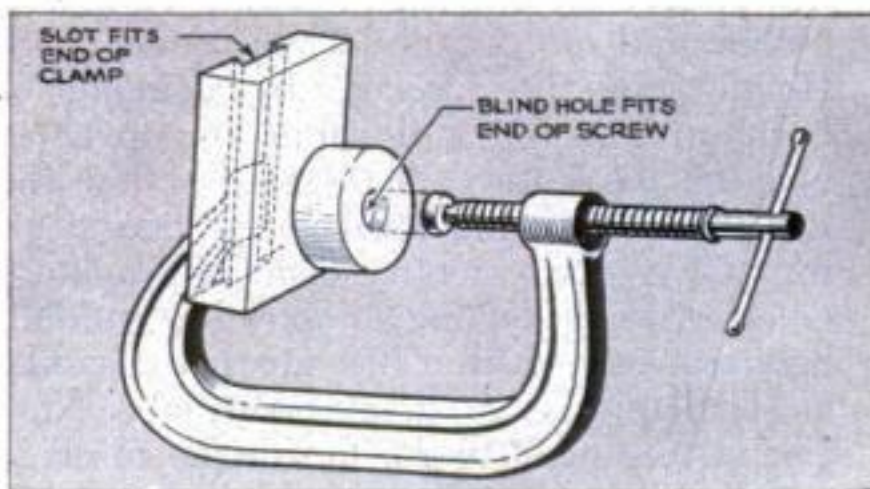
A PLYWOOD box in the back seat will protect the upholstery while you are traveling with your dog, and will keep him comfortable as well. Our yellow Labrador rides in the box shown, and he seems to like it.

For a smaller dog, you could make the box narrower, although it's advisable to provide enough space for him to lie down. The suggested dimensions may require some changing to suit your car. Assemble the

parts with small screws countersunk a bit.

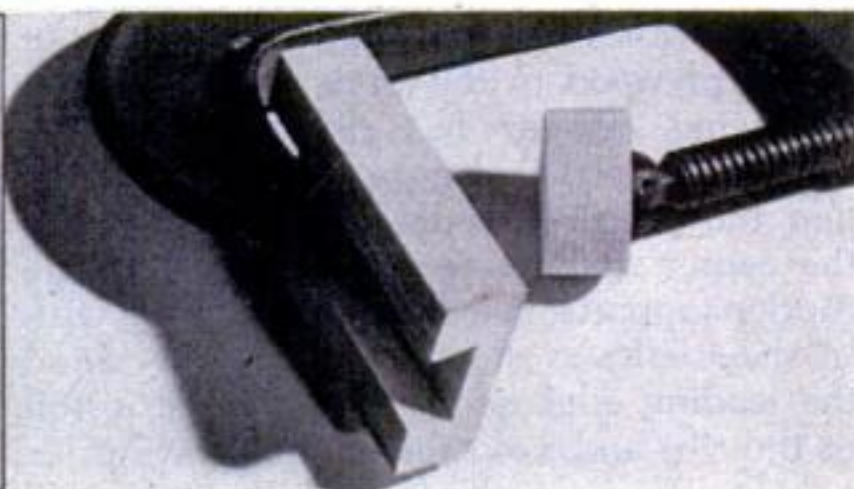
The two legs that support the front of the box are hinged to the box. This makes it easier to get the box through the door. A roll of canvas under the back edge of the box keeps it level. A pad of old blankets covered with canvas fits into the box. To keep the dog from the front seat, we clamp a piece of plywood to the front of the box.—*Ruth Hodgson, Eagle River, Wis.*

Protective Pads Won't Fall Off Clamp Jaws

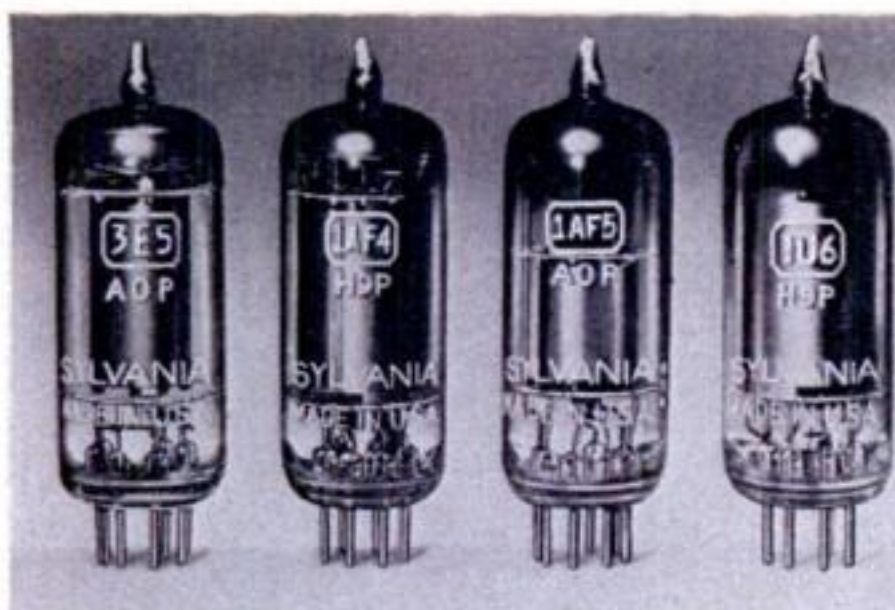


PIECES of wood placed under clamp jaws to protect the work have a habit of slipping as you set the clamp. The protective pads shown above will save you that annoyance.

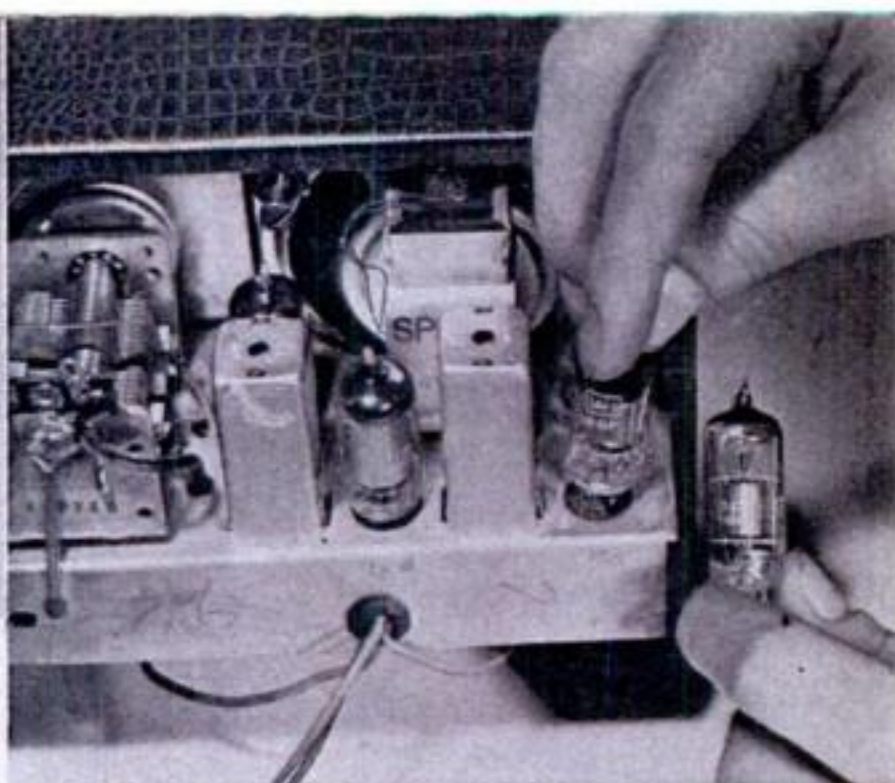
Make them of softwood. In one, bore a



hole for a snug fit over the screw jaw. In the other, cut a slot so the block will be a tight press fit over the stationary jaw. The trick works equally well on a C clamp.—*Herbert Pfister, The Bronx, N.Y.*



The low-drain miniature tubes are pictured above. In portable at right, a burned-out 1S5 was replaced by a 1AF5. The set works as well and flashlight-cell A supply lasts longer.



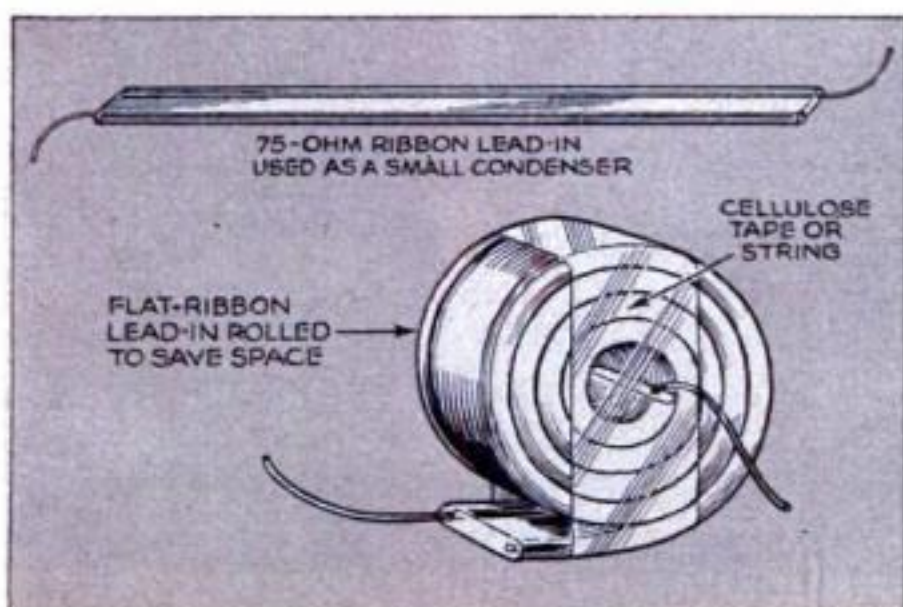
New Radio Tubes Save Batteries in Portables

NEW types of 1.4-volt miniature tubes that draw only 25 milliamperes of filament current may triple the life of A batteries in portable radios. Present 1.4-volt miniatures take 50 ma. Halving current consumption triples useful battery life, according to Sylvania Electric, makers of the tubes.

Three of the four new types have the same pin connections as present tubes and

may be interchanged with them in many cases. Greatest battery saving is obtained when all four are used.

The new tubes are the 1AF4, an RF pentode similar to the 1U4; the 1AF5 diode-pentode amplifier, similar to the 1S5; the 3E5 power-output pentode, similar to the 3V4; and the 1U6 pentagrid converter, which has no equivalent.



Small Capacitors from Lead-in

ELECTRONIC experimenters working with high frequencies often need very small capacitors. It isn't easy to buy condensers of very low value, but you can make your own from coaxial cable and flat-ribbon lead-in.

These cables, widely used as television transmission lines, come in several impedances from 50 to 300 ohms. Most catalogues list impedances and also give the capacity-per-foot for each type. Capacities range from about 4 to 30 mmf. per foot.

By calculating the necessary length, you can turn scraps of transmission line into accurate capacitors of almost any low value. —Arthur Trauffer, Council Bluffs, Iowa.

The Height of Ingenuity

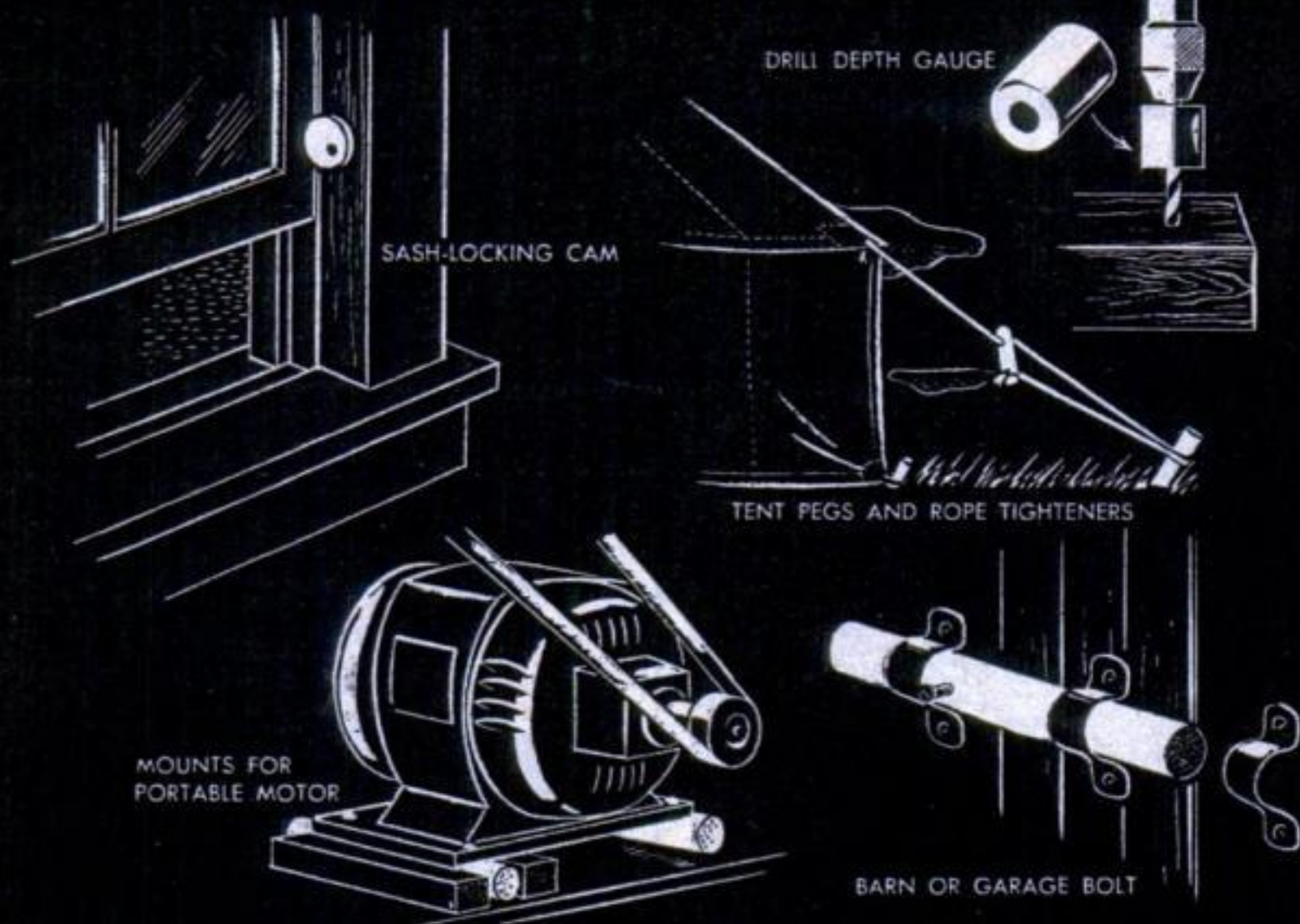


We were at the beach when one of the cars in our party broke down. The nearest garage was miles away. Even though we had another car, we had no tow rope. How do you think we towed the disabled car to a garage?

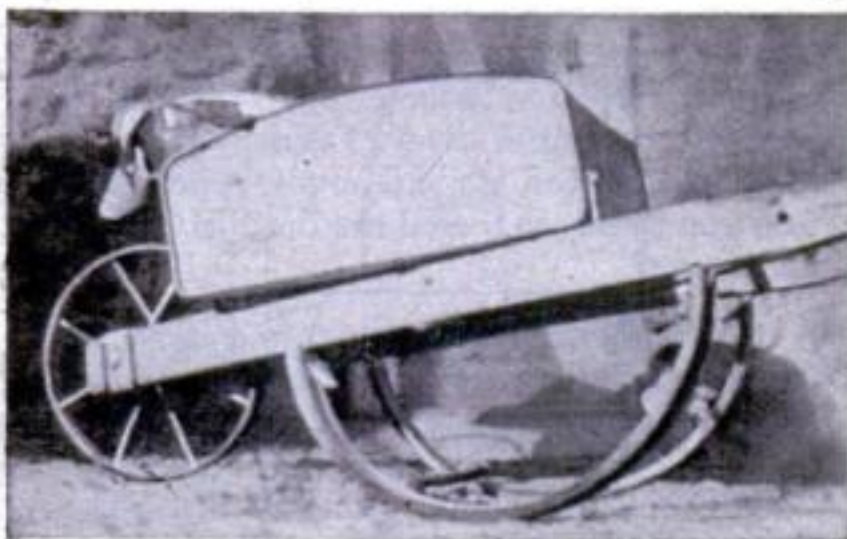
The kids were playing in the water with two inner tubes. We borrowed these, let the air out of them, and hooked the tubes over the rear vertical bumper guards of the good car and over the front guards of the disabled car. They served as a perfect tow rope. —Mrs. Floyd Marquette, Warren, Ohio.

Use an Old Broom Handle

AN OLD broom may not pick up much dust, but its handle can clean up a lot of odd jobs. If you slice off a thin section of the hardwood handle, you have a wheel. Give the wheel an off-center axle, and it becomes a cam. Two lengths of broom-stick make an excellent base for a motor that has to be moved from one machine to another. A few of the other jobs that an old broom handle takes in its stride are sketched below.



Wheelbarrow Built from Scrap

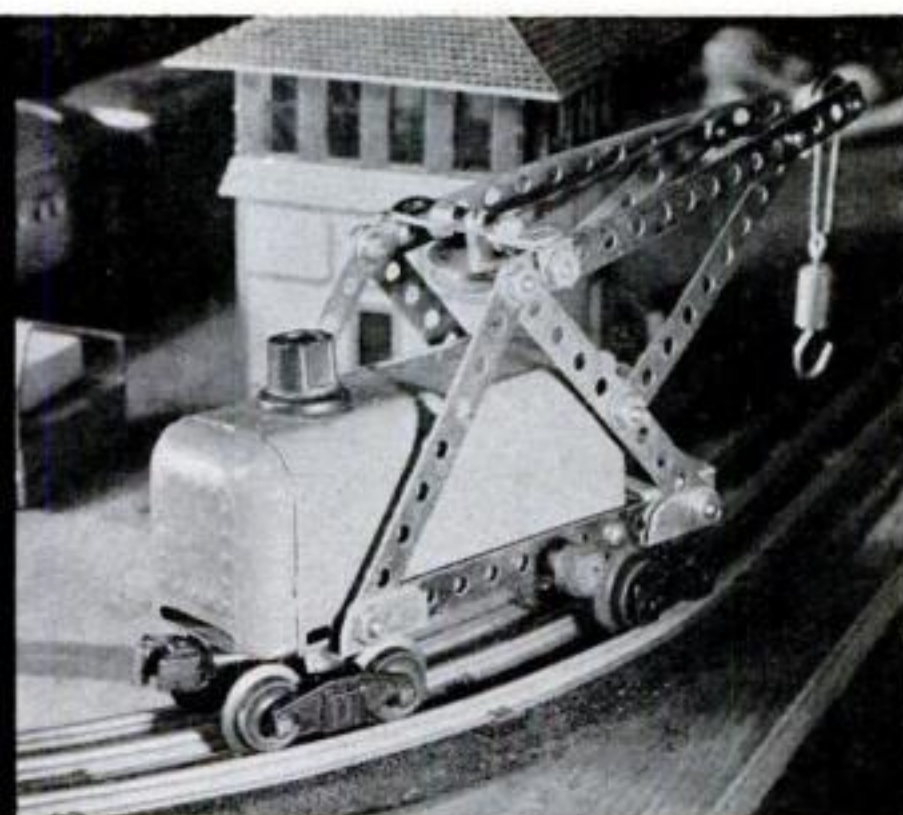
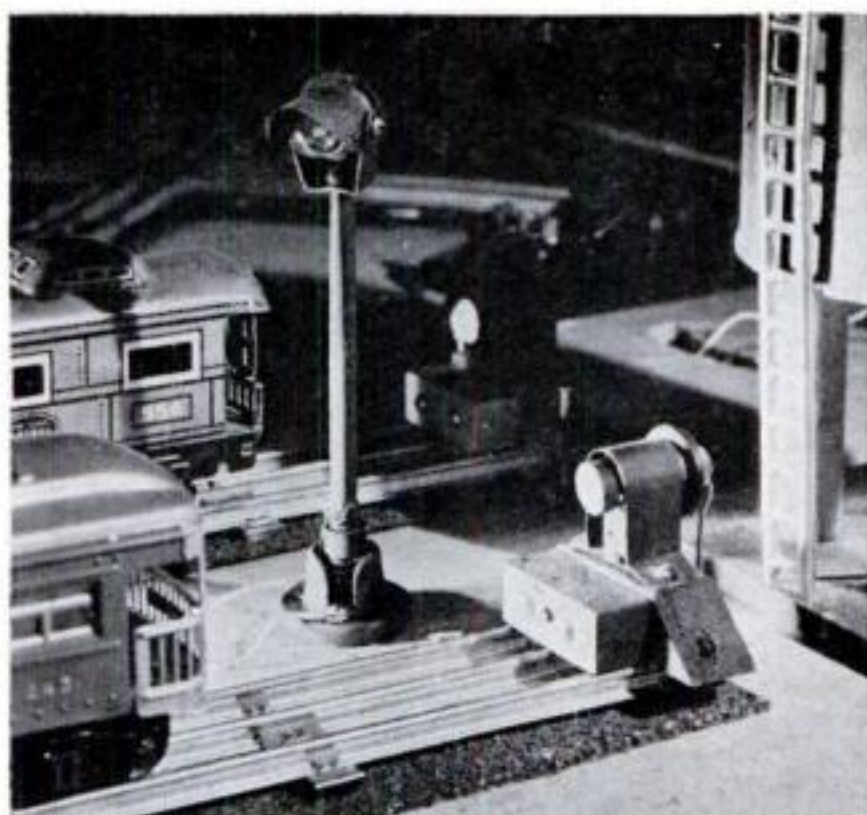


A MODEL-T rim and an old gas tank are the main parts of this homemade wheelbarrow. The wheel is from a worn-out bar-

row and the handles are two-by-fours. I hacksawed the rim in half and drilled holes in the ends for U bolts to anchor the halves to the two-by-fours. The rim was cut so the four lug-bolt holes could be used to attach cross braces. After the top of the tank was chiseled out, the tank was bolted to the two-by-fours.—Howard L. Corwin, Rhame, N. D.

Blowtorch Colors Wood

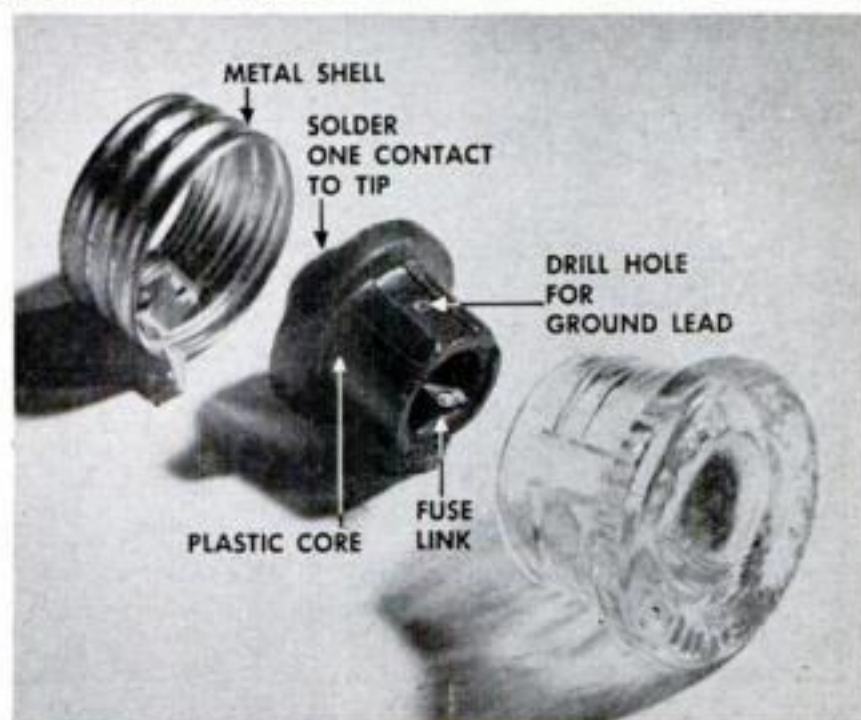
AN INTERESTING, semi-natural wood finish can be obtained without using color or stain by "toasting" the wood with flame. Use a blowtorch or a gas or coal flame and blacken the wood evenly all over. Scrub off loose char with a fine wire brush and apply varnish or shellac.—J. E. Bird, Carrollton, Ill.



Old Fuses Can Dress Up Your Model Railroad

MODEL rail layouts can take on new luster if you examine your burned-out fuses before throwing them in the ash can. The molded-plastic centers of some fuses have hollow cores that make excellent receptacles for miniature lamps. You can easily put them to work as rail-type lamp sockets, end-bumpers, yard floodlights, block signals, and the like.

Examples of the first two types are shown at the upper left. To make a socket, unscrew the threaded metal shell of a fuse and lift out the core. Bend down the remnant of the fuse link inside the plastic center, and solder one wire to the contact tip of the fuse. To make the second connection, drill through the side of the core, slip a wire through the hole, and loop it around the base of the bulb.



The massive appearance and dull black finish of the molded centers suggest other uses in model work. The dummy stack (upper right) was mounted on the cab roof by drilling a hole to fit and cementing the plug in place.—*Carlton Bucher, White Plains, N.Y.*

Ring Locks New Tripod Head

A THREADED ring adjusts the tension against the swivel ball of the new Tip-Top tripod head, made by the B-T Company, Inc., of Milwaukee. It has a 360° horizontal swing and a 180° vertical swing. Turned from aluminum bar stock, the head is suitable for small- and medium-size cameras.



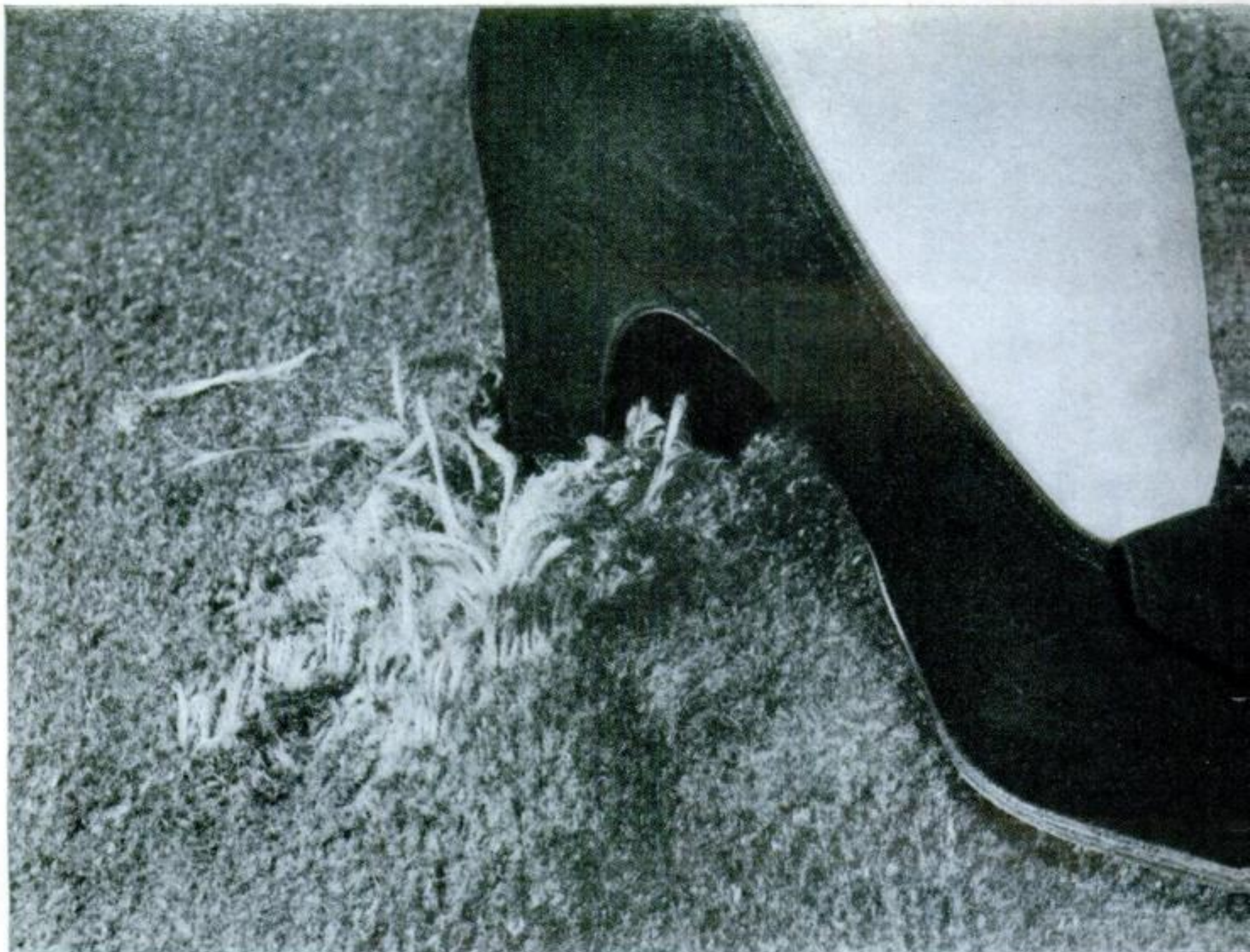
The lower of the two rings fastens it to the tripod. The head sells for about \$2.

Starting Flooded Outboard

IF YOU can't start your outboard because the carburetor is flooded, try this: Shut the needle valve, and then crank the motor. If the trouble is due to flooding, it will often start on the second or third pull. As soon as the motor catches, set the needle valve to its normal position.—*L. S. McCready, Kings Point, N.Y.*

Scaffold on Truck Saves Time

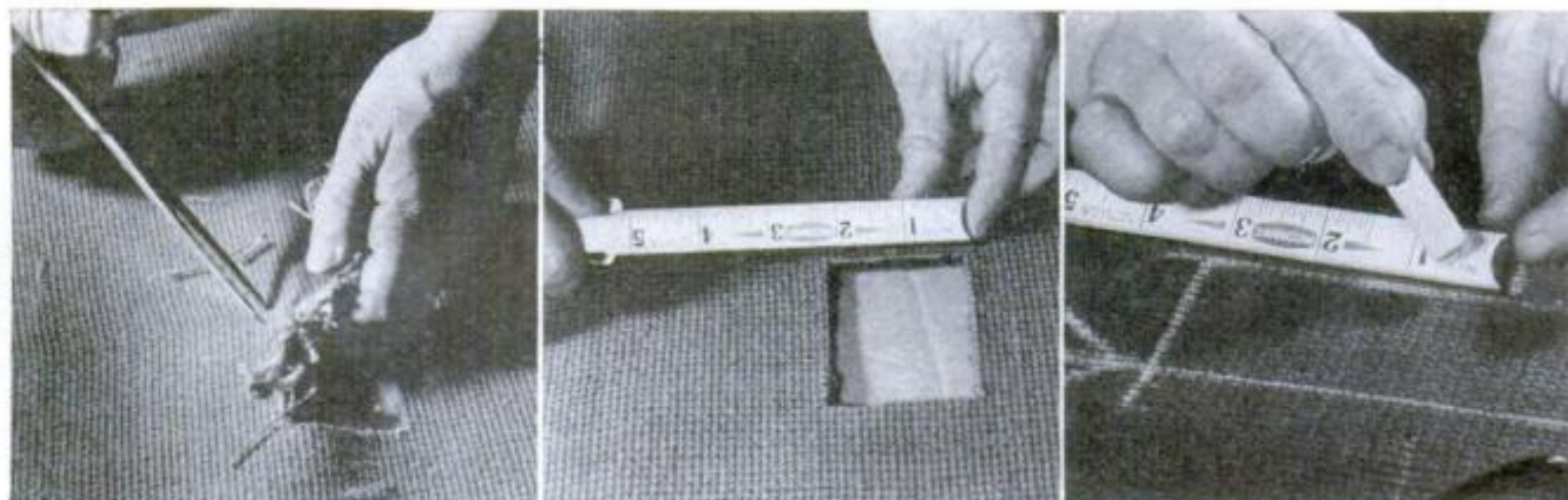
WHILE putting new siding on our two-story shop, we hit on the idea of building the scaffold on a truck. Then we simply drove the truck around the shop. It saved a lot of time and material.—*Nate Schoenbrun, Scranton, Pa.*



Ugly worn spot looks like major repair job, but fitting almost invisible patch is not hard.

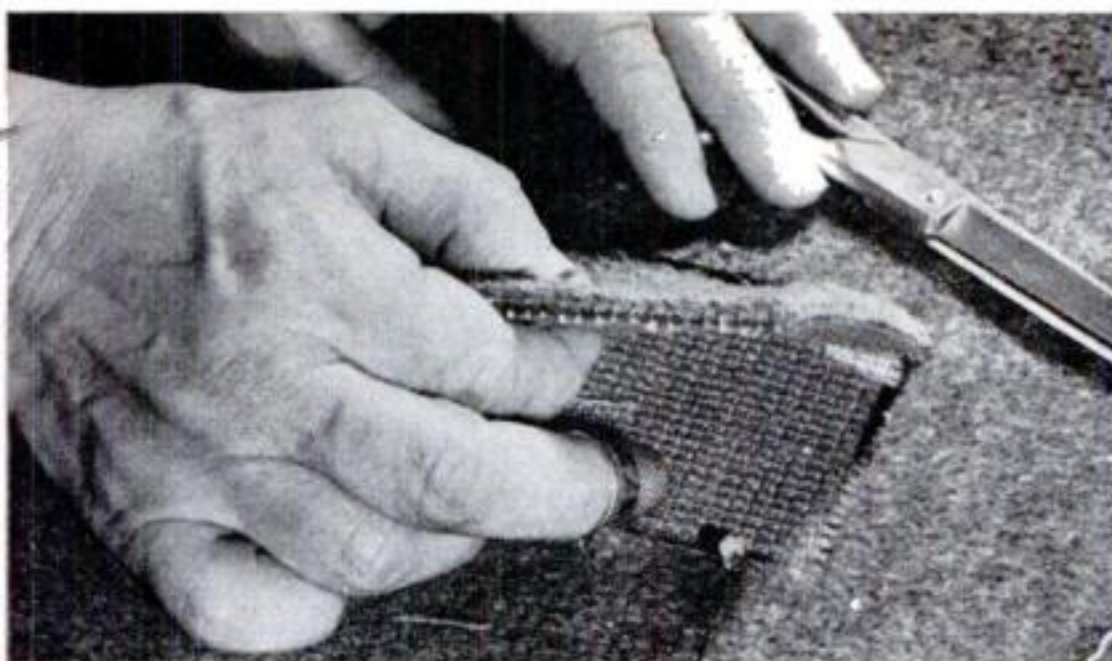
An Expert Tells You

How to Repair Your Own Rugs

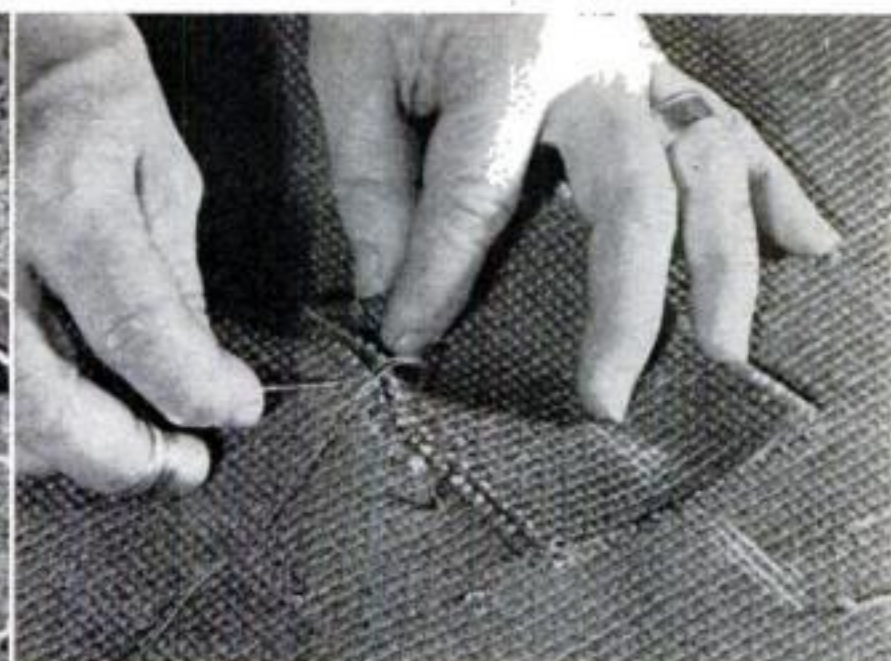


1 To repair a hole or worn spot, turn carpet face down on floor. Trim away all ragged edges (left), leaving a neat rectangular or square hole. Carefully measure cutout area (center). Then lay out the dimensions of patch

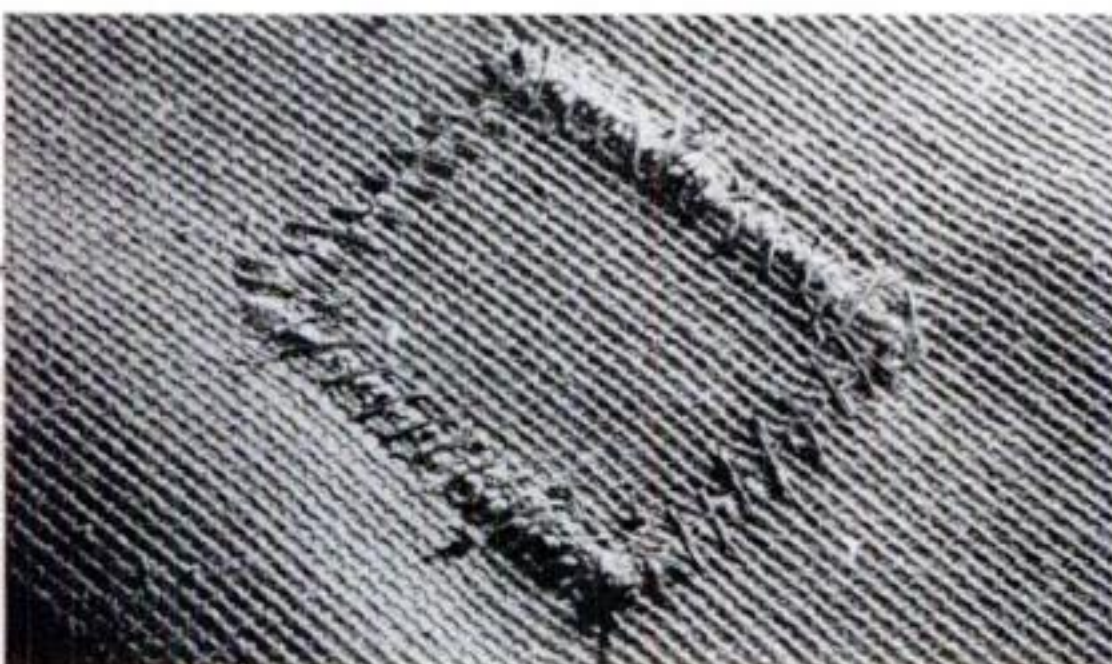
on a piece of matching carpet (right). Cut patch so nap runs in same direction as nap of carpet. You can tell direction of nap by running your fingers over carpet. If it feels smooth, you're moving with nap; rough is against nap.



2 Make sure patch is accurate fit (left), trimming edges of opening or of patch to make seam smooth. Fitting of the patch is done from



top of carpet. With carpet turned over (right), sew patch with whipstitches. Don't run stitches all the way through the carpet.



3 From underside of carpet, completed repair job looks like this (above). Turned right-side up, it's hard to tell patched area from



rest of carpet (above). Whipstitches shown here are about $\frac{1}{2}$ " long so they overlap patch and surrounding carpeting by about $\frac{1}{4}$ " each.

By Helen M. Klemm

PS photos by W. W. Morris

The author of this article, Mrs. Helen M. Klemm, is as much at home repairing a medium-priced throw rug as she is standing high on a ladder and re-weaving a huge, antique Flemish wall tapestry.

Mrs. Klemm has followed her profession both in the United States and in Europe. As a sideline, she attends auctions with her clients, advising them on rugs, needle point, and tapestries they intend to buy.

IF YOU can handle a needle and thread, you can mend your rugs and carpets. It's not difficult, but strangely enough I've run across very few housewives who've even tried their hand at this simple chore.

"Rug repairing is a man's job," they

usually say, "and only a professional can do it. Besides," they add, "it's expensive."

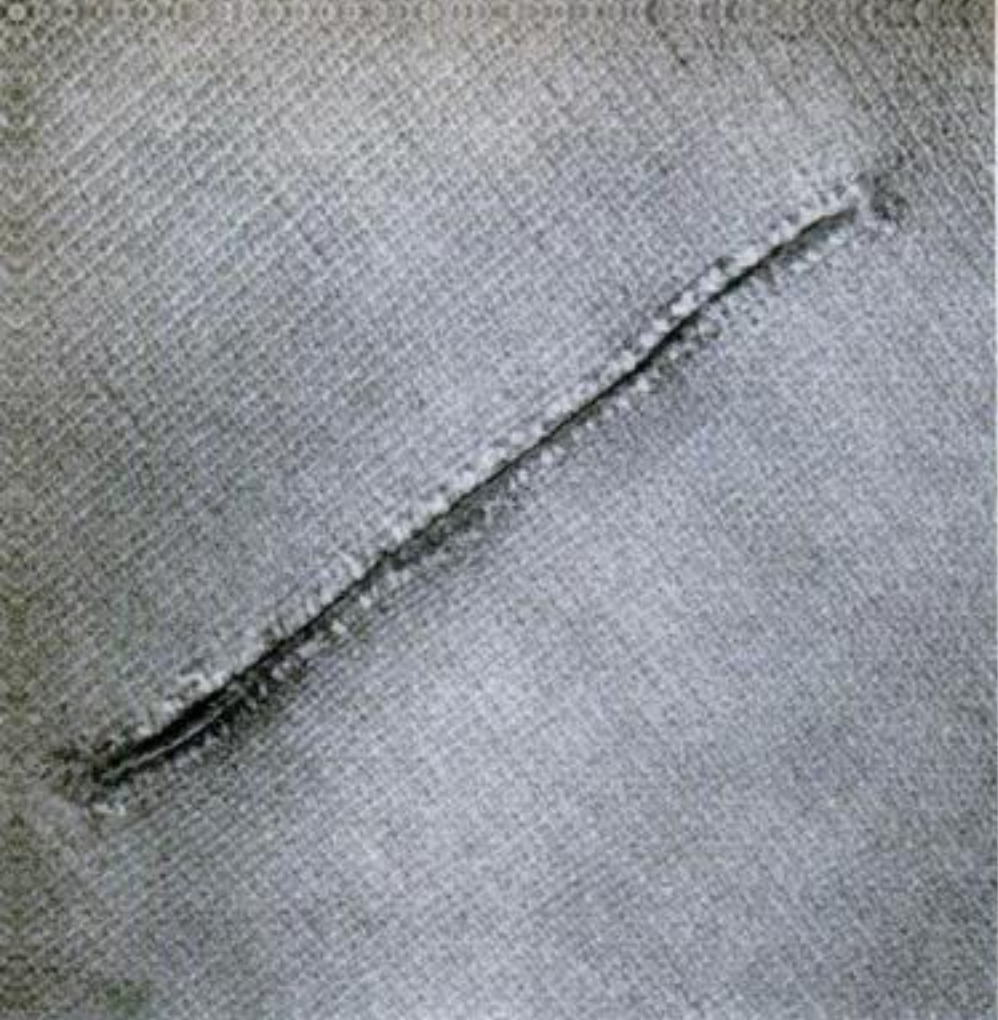
Fortunately, none of those statements is true.

Any woman who can shift a sofa to clean behind it can pull a rug up on a table to rebind it. And it costs but little. To rebind all the edges of a 9' by 12' rug, for instance, will cost you less than \$2. And that price includes all materials.

Check your rugs and carpets today for needed repairs. I'll show you how to mend holes and tears, rebind edges, put on new fringes, and make a curled-up corner lie flat.

Repairing holes. Besides being unsightly, a hole worn in a rug can be dangerous—you might catch your foot in it and trip. If yours is a solid-color carpet, the first thing to do is get a piece of matching material from a carpet store. Or you may have scraps left from the time the carpet was laid.

Turn the rug face down and enlarge the



Rips like this start as breaks in body of carpet and at first can only be seen from back of carpet. Regular inspections of floor coverings



catch breaks before they become bad. Working from back of rug, pull break together with whipstitches and seal with gummed edging (above).

damaged spot to a neat square or rectangular hole. A pair of shears will do the job. Then cut a patch to fit exactly. Use a strong steel needle and carpet thread. Sew from the back of the rug, taking close whipstitches about $\frac{1}{2}$ " long— $\frac{1}{4}$ " in the patch and $\frac{1}{4}$ " in the carpet. Don't push the needle all the way through the rug—just about half way through. Then the stitches won't show on the surface.

Mending a hole in a multicolored rug, unfortunately, isn't so easy. If the hole is a small one—about the size of a dime—you can do it. Large ones should be left to an expert. To repair a small hole, first sew a piece of embroidery or needlepoint canvas

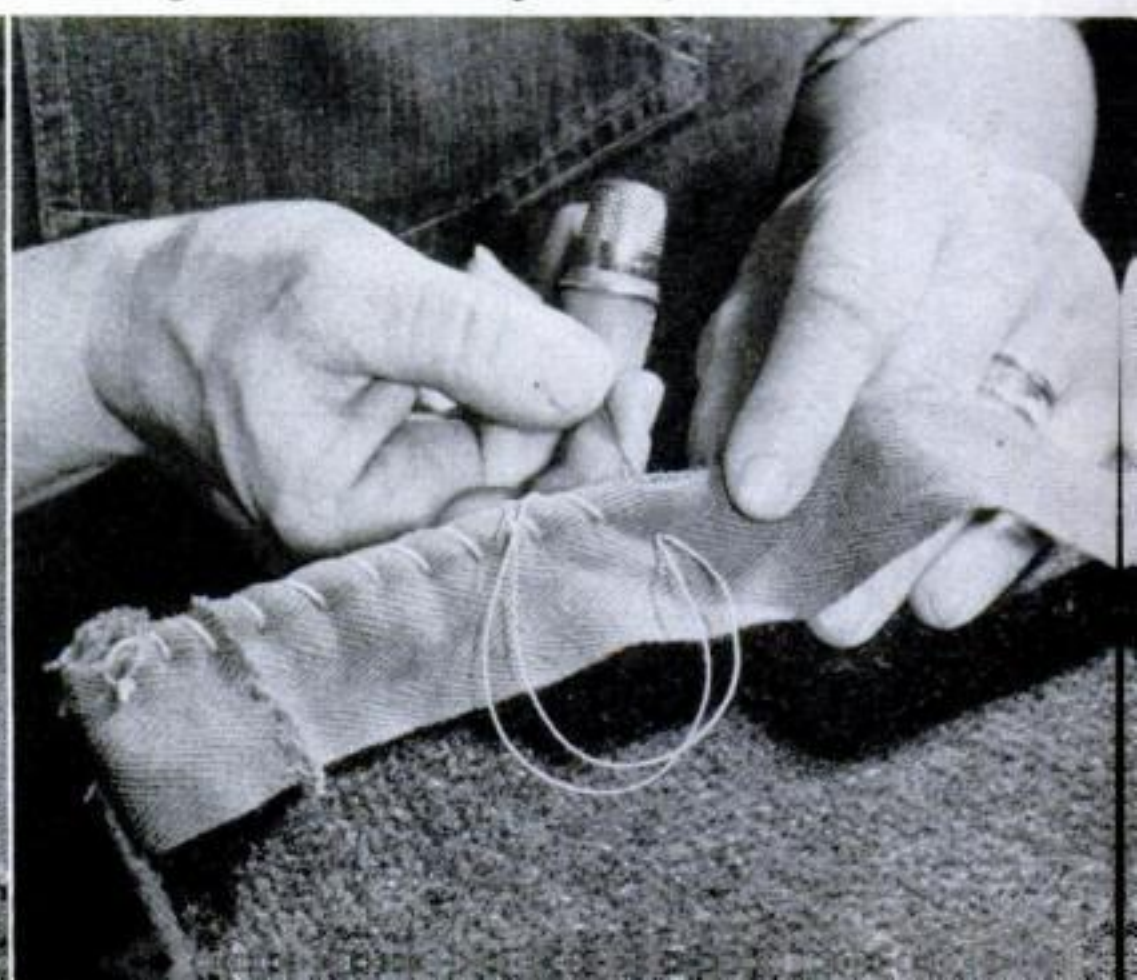
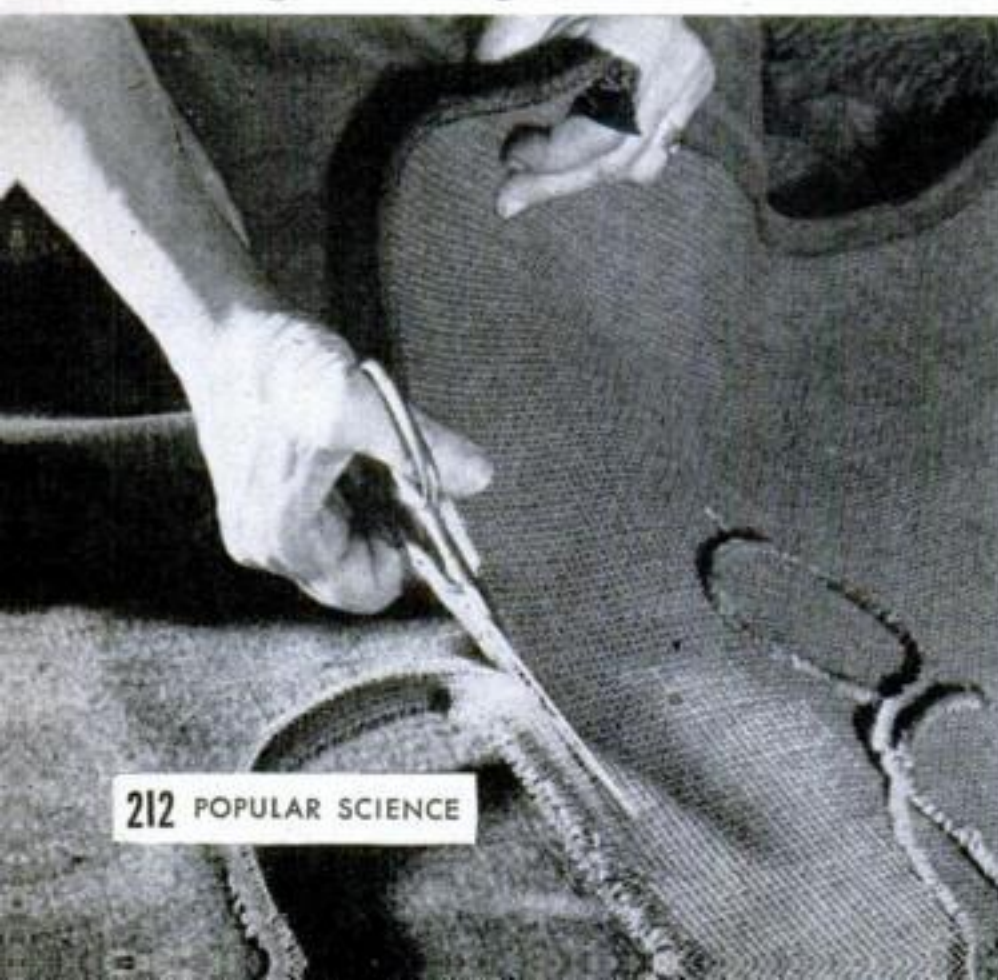
to the underside of the rug. Cut the canvas slightly larger than the hole. On the top of the rug, replace the lost pattern with small stitches of colored tapestry wool.

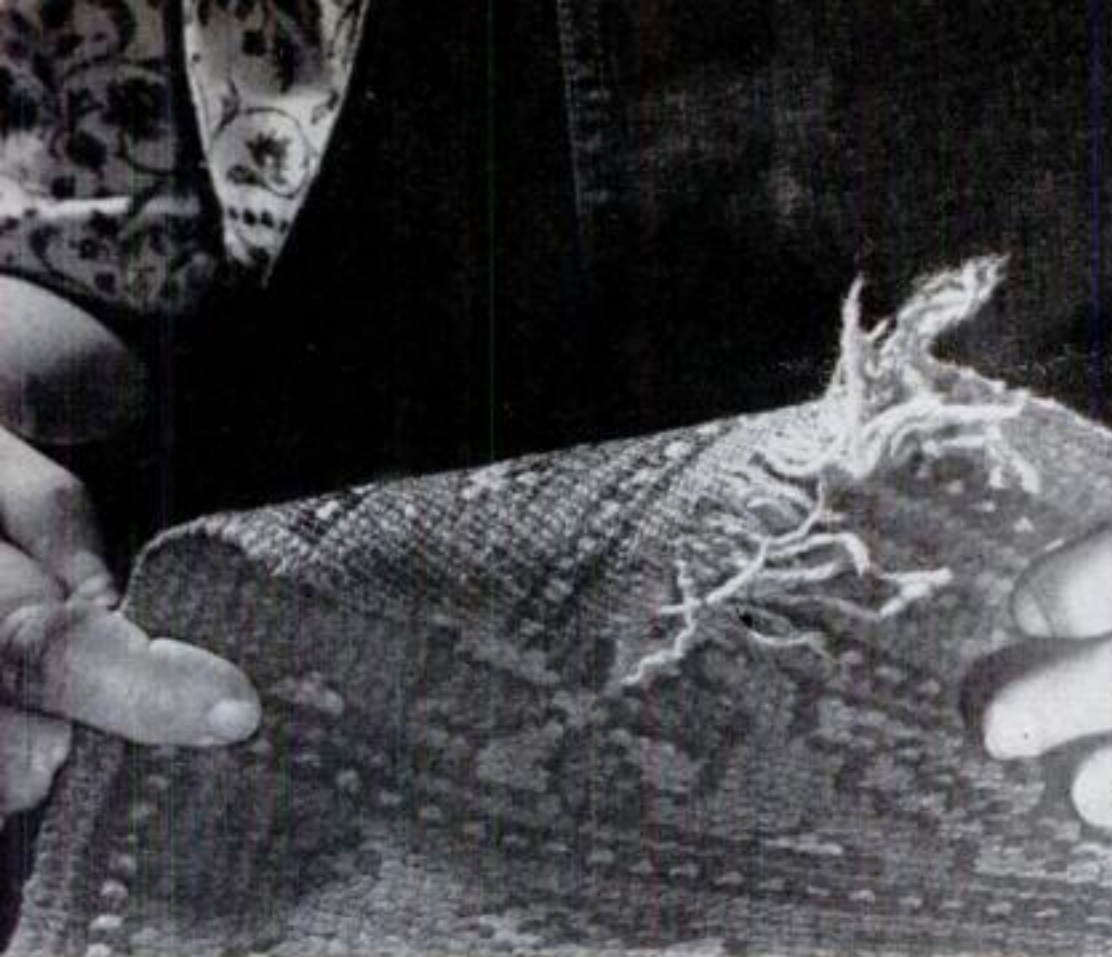
Repairing frayed edges. Worn edges are one of the most common rug ailments. Fraying usually starts in a path of heavy traffic, exposing the rug to dangerous unravelling.

For this job, you need matching cotton binding, carpet thread, and a steel needle. Get enough binding for all four sides even though you intend to fix only one side. You might have trouble getting the same color binding at a later time. And allow a few extra inches when you buy the binding.

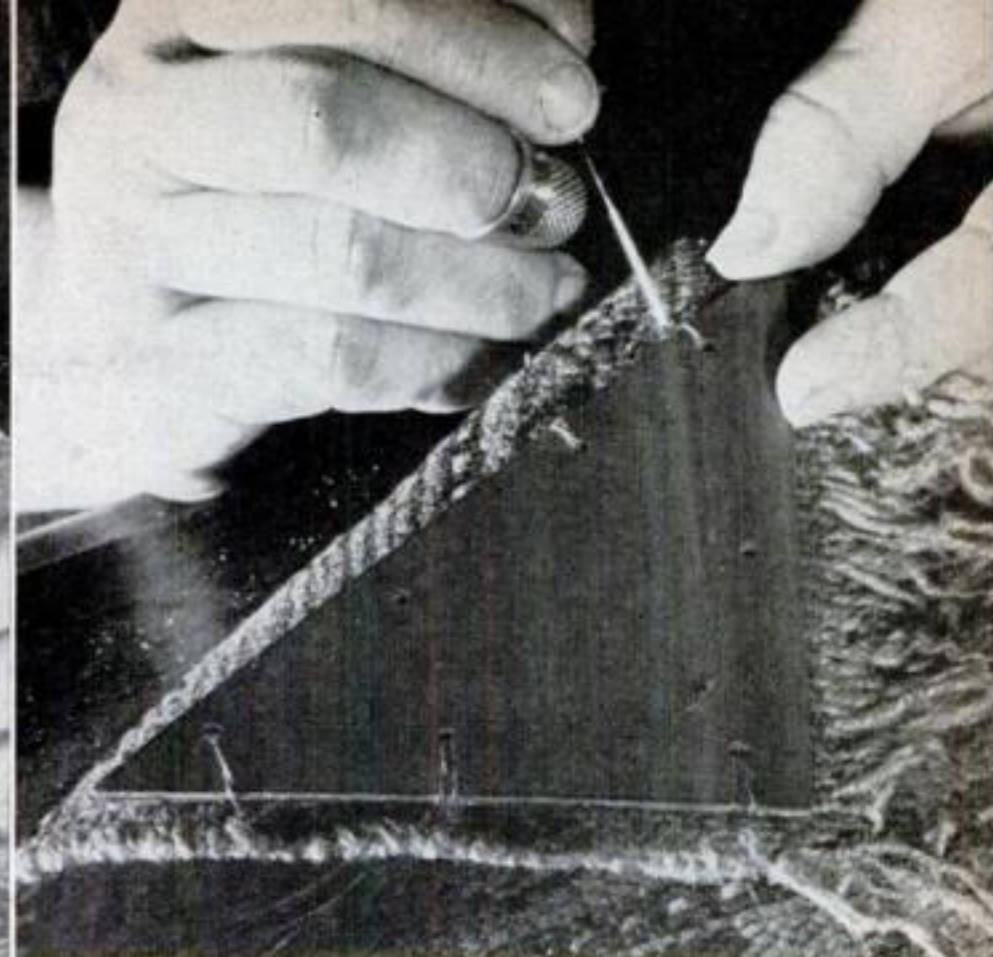
1 When binding wears away and edges of carpet begin to unravel, turn rug over and trim edge to a straight, neat line with scissors.

2 Lay full width of new binding on carpet's edge. Working from right to left, attach binding with narrow whipstitches, as shown.





Rug corners that persist in curling up can be made to lie flat permanently with a simple triangle of plastic. Anti-curl corners are thin and



stiff and have holes along all three edges. Sew one to the underside of a curling corner (right) and the corner will lie flat.

With the carpet face down, trim the edge to a straight line. Then turn the carpet face up. Lay the binding along the edge of the carpet. Fold under a $\frac{1}{2}$ " or so at the corner and whipstitch the edge of the binding to the edge of the carpet. When you've sewn all along one edge, turn the binding firmly under the carpet's edge and sew the binding to the underside of the carpet with big stitches. Do not run these stitches all the way through.

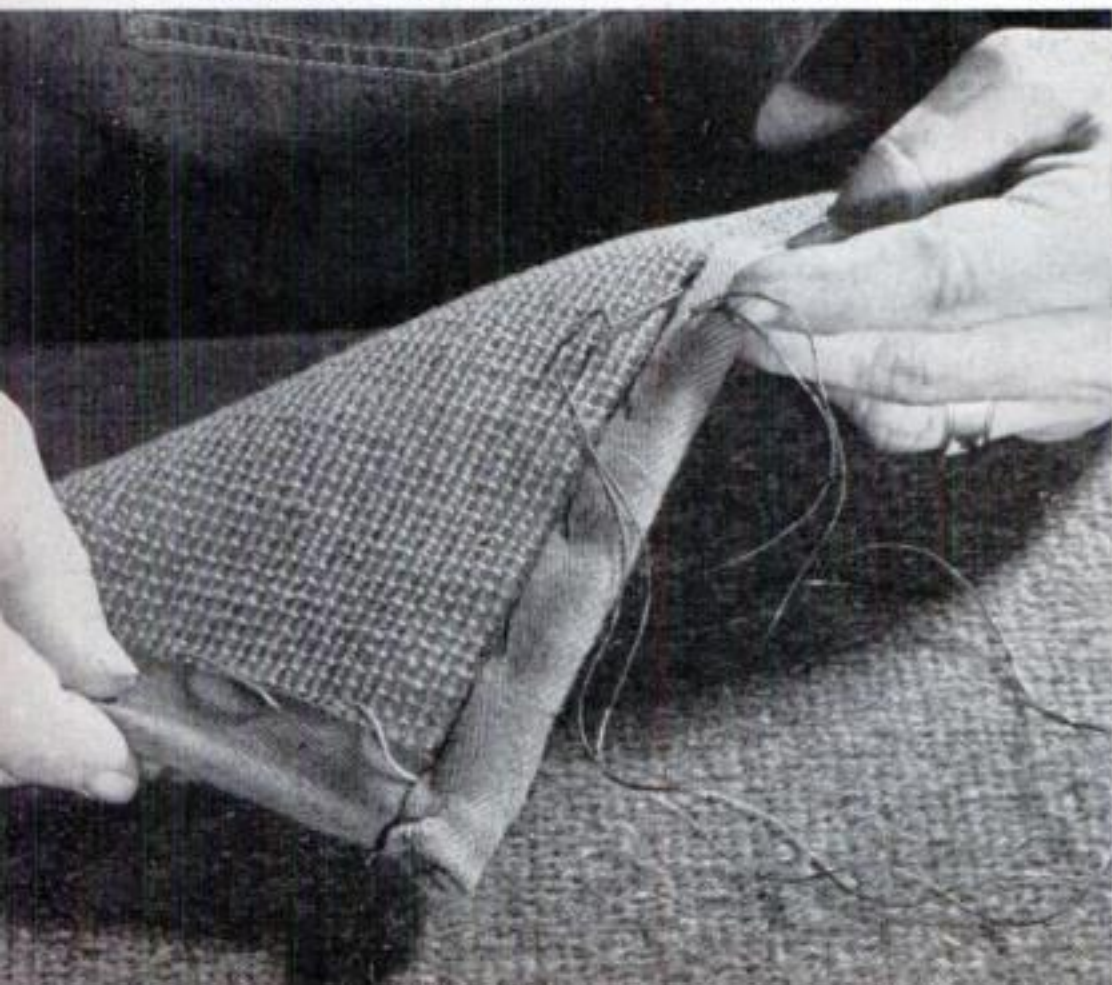
New fringes. When your rug looks untidy because of worn fringes, detach the old material. If the edge of the rug is not even, trim it to a neat edge. Overcast the edge with linen thread to stop further unravelling.

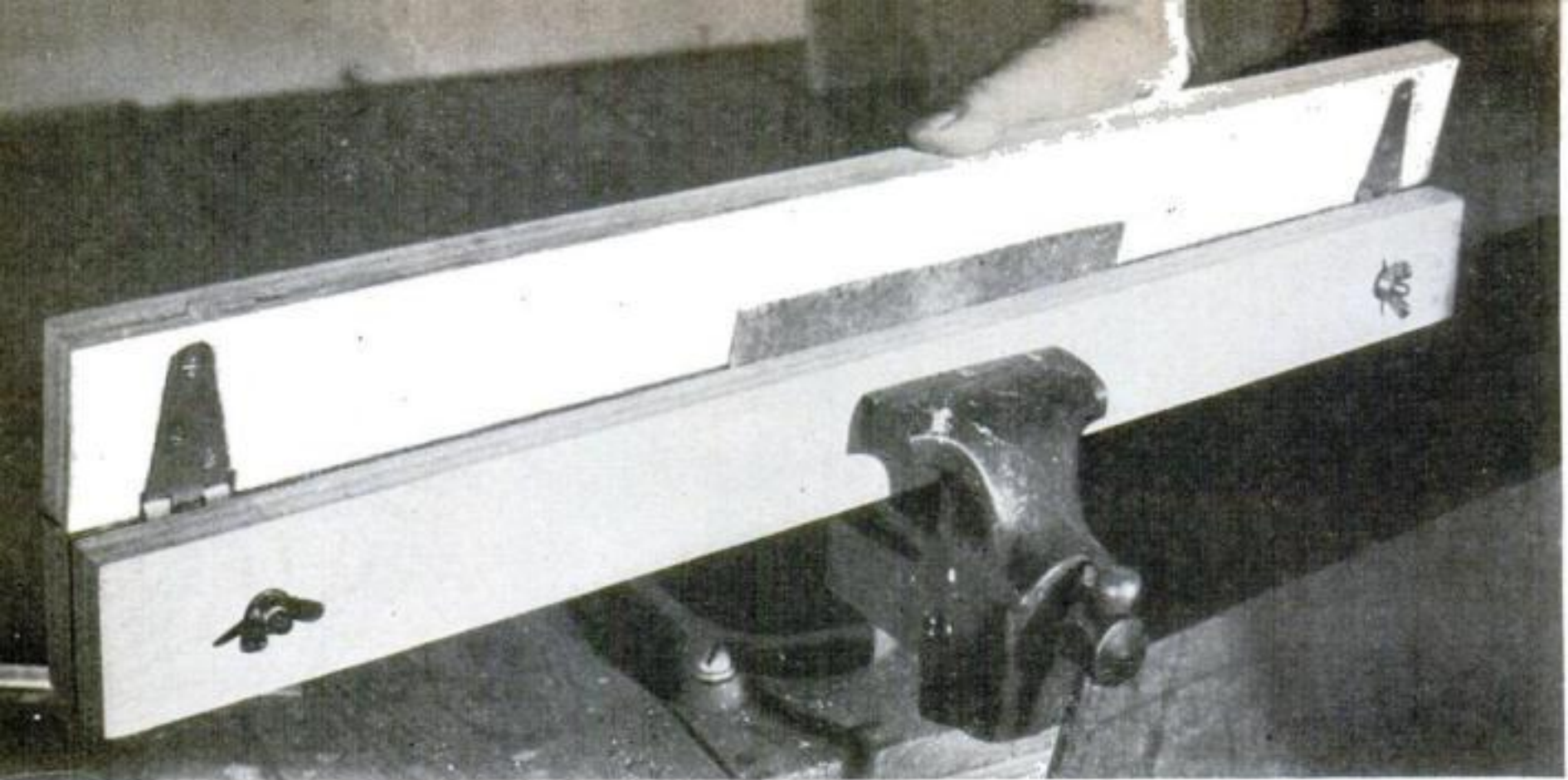
3 Then fold the binding around the edge of the carpet and sew it to underside with stitches that don't go all the way through rug.

Buy a doubleheaded fringe. This has a double strip to which the fringe is attached. Sandwich the edge of the rug in the double strip and sew it to the rug.

Mending rips. These usually start as superficial breaks in the body of the carpet and—at that stage—can only be detected from the underside of the rug. With double carpet thread and a steel needle, make big, close whipstitches across the break. Then seal the stitches with a strip of gummed edging—the kind you apply with a hot iron. If the damage is only a small break that hasn't gone all the way through the rug, you don't need to stitch it. A piece of gummed edging will do the job. END

4 Ready-made, doubleheaded fringes are easy to attach. Slip edge of rug between heads of fringe and sew fringe on with matching thread.



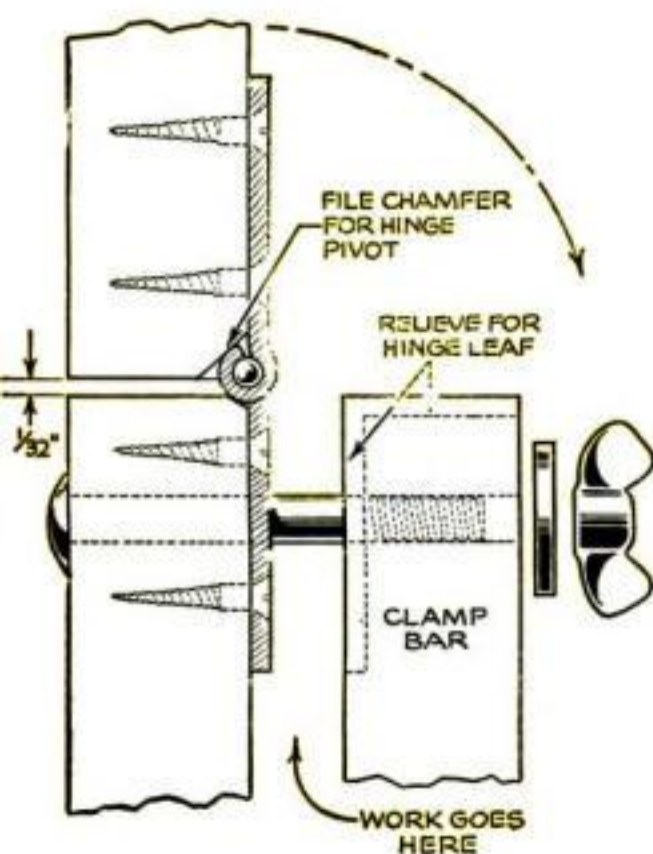


Homemade Wooden Brake Forms Long Bends in Sheet Metal

It's usually hard to make clean, sharp bends in sheet metal longer than the width of your vise jaws. But with the simple bending brake shown here, you can form channels, simple moldings, and fluorescent-lamp reflectors of moderate length.

Use at least $\frac{3}{4}$ " oak or maple for the two leaves. Surface-mount two sturdy strap hinges on them, centering the pivot pins as closely as possible on the lower arris of the movable (top) leaf. Cut a shallow step at both ends of the clamp bar, on the inside face and top edge, for the hinges. Drill $\frac{1}{4}$ " holes for carriage bolts to pinch the work between one leaf and the clamp bar.

Scribe the sheet metal where the bend is to be made and clamp it with this line along the top of the bar. Lock the brake in a vise as shown for extra rigidity. Then fold down the top leaf to the desired angle.—*Dick Hutchinson, El Monte, Calif.*

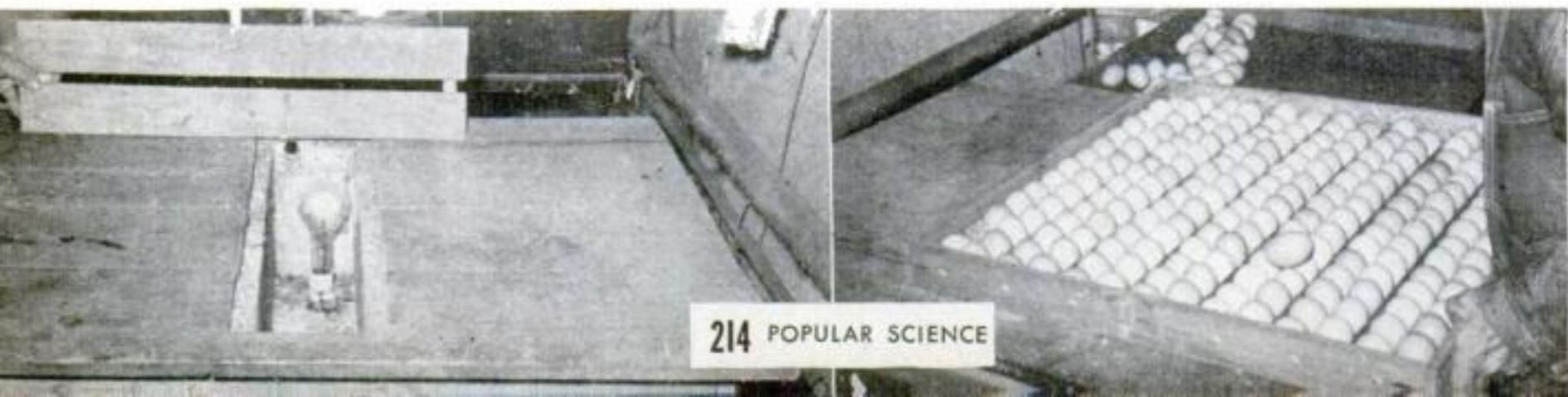


"Production-Line" Egg Candler Made from Table

To SORT eggs faster, Charles L. Stratton, of Hollis, N. H., converted an ordinary wooden table into this production-line candler. He cut a 7" by 26" opening across the center of a 32" by 42" table and reinforced the table by nailing strips to the underside. Then he built a trough-like box and nailed it below the cutout. In the trough he mounted sockets for two 100-watt lamps. For the box cover, which comes flush with the table, he cleated together two

wooden boards, leaving a $\frac{1}{4}$ " space between them through which the bright lights in the trough shine up.

To use the candler, Mr. Stratton racks his eggs in a square frame and slides the frame over the table. The light beam, shining through the narrow slit in the cover, strikes one row of eggs at a time. The light shows through infertile eggs, so they are easily distinguished from the dark-centered, fertile ones.





Two small nozzles under back edge of hood direct water against windshield above the wipers.

How to Make a Windshield Washer

By Walter E. Burton

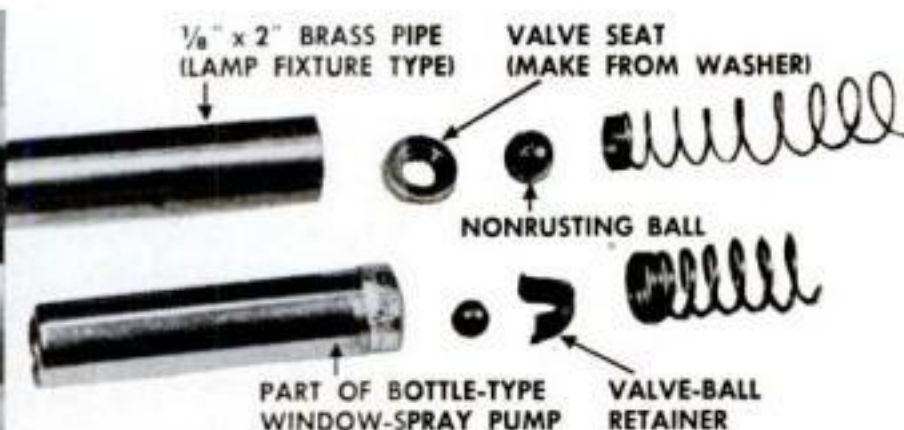
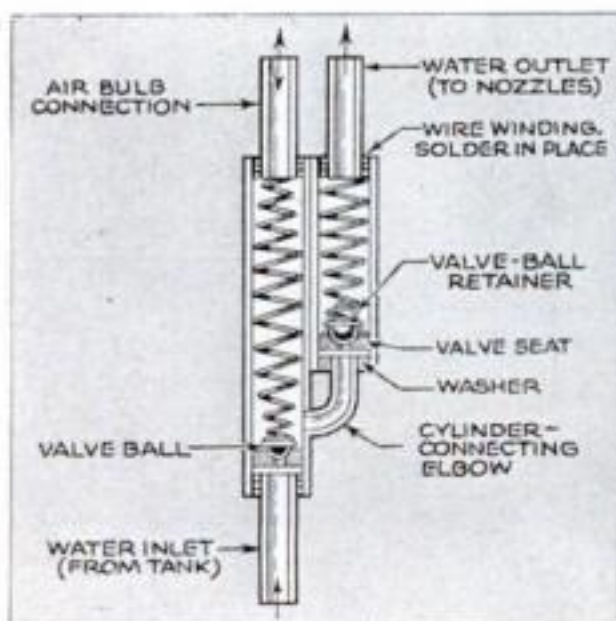
PRESSING a rubber bulb on this home-made windshield washer sprays enough water so the wipers can quickly clear your view. It's a real safety aid, especially for cleaning off that bug-and-dust smear that makes night seeing so difficult. Building it is mostly a soft-soldering job, and the cost should run no more than a dollar.

The valve unit. This consists of two metal tubes, each with a ball valve. To keep the job simple, buy a couple of the inexpensive finger-operated pumps used for spraying home windows. From each pump unsolder the short tube containing the valve assembly. These ready-made valves put you well on your way.

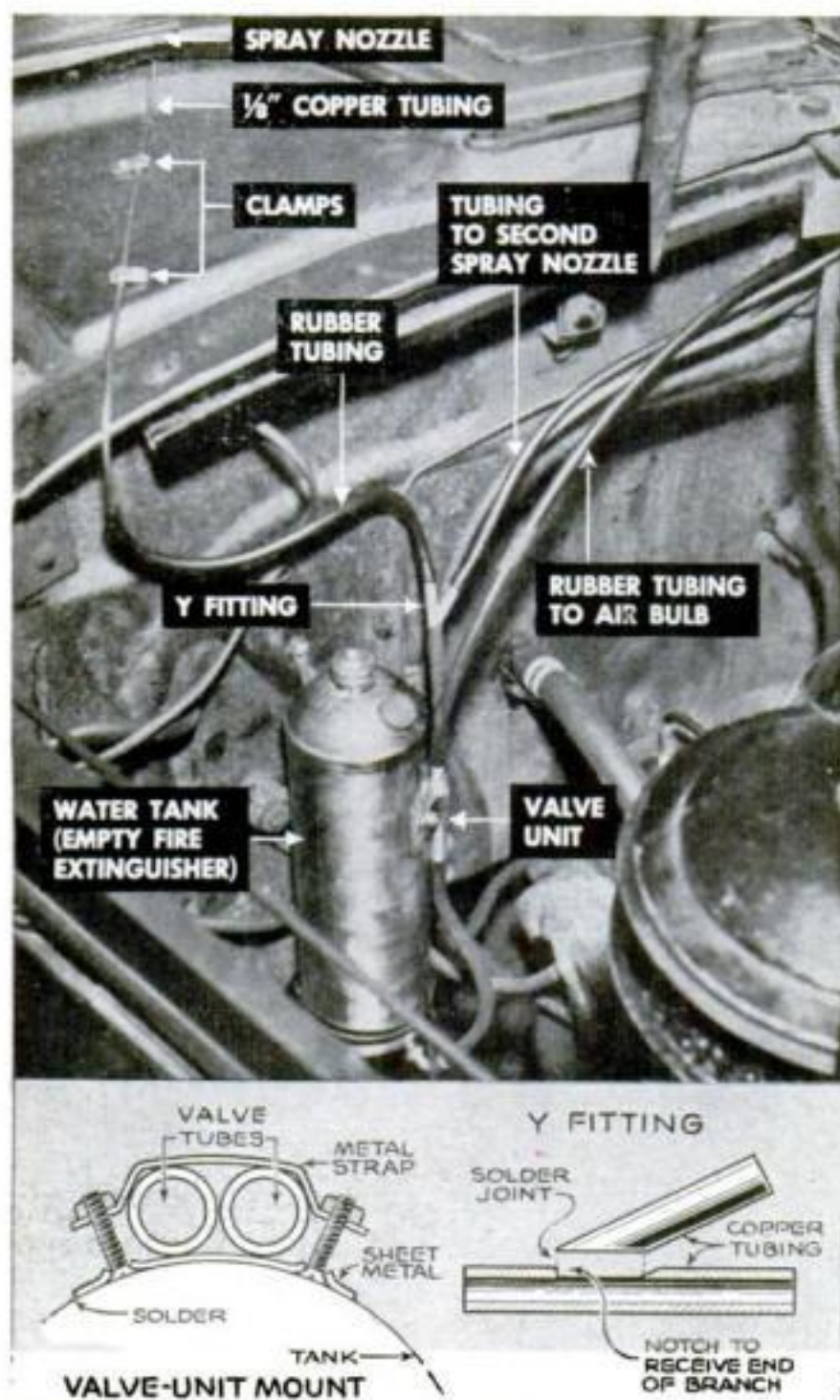
You can also start from scratch, using $\frac{1}{8}$ " ($\frac{3}{8}$ " o.d.) brass pipe of the lamp-fixture type for the valve cylinders. Cut one piece 2" long, another 1 $\frac{1}{4}$ ".

Make the valve seats from brass washers at least $\frac{1}{8}$ " thick. Enlarge the hole on one side with a countersink to give the ball a good seat. File or machine the outside diameter until the washer is a snug fit. Seal it in the pipe with solder. You can keep the valve balls captive by either of the methods shown in the drawing. Use only brass or stainless balls and springs.

Assembling the valves. Solder the two cylinders together side-by-side, staggering them to make space for the connecting elbow. Drill a hole in the longer (or lower) cylinder just above the valve. Bend the el-



Heart of washer is two check valves. In one valve, spring itself is formed into a cup to hold ball. In other, spring holds U-shaped retainer. Either system can be used for both valves.



Water tank can be clamped to fire wall. Nozzle tubes pass under hood seal and are bent up and flattened at ends. Drawing shows Y fitting and how the valve unit is mounted on tank.

bow from small tubing and solder one end into the cylinder-wall hole. Solder the other into a washer snugly soldered into the bottom of the second cylinder.

After the springs and balls are in place, fit the three short (about 1" long) pieces of tubing to the ends of the valve unit. Select these so the rubber tubing you plan to use will be a tight fit. To install the three short tubes, wrap bright copper wire around the

Control bulb can be placed inside leather holster strapped to steering column, or inside a box fitted with a push-button squeezer. Such a

ends, slip them into the cylinders, and secure with solder.

The tank. For my washer, I used an empty brass fire extinguisher of one-quart size, clamped to the fire wall. The valve unit is held against the tank by a sheet-metal strip and bolts that pass through another strip soldered to the tank. Water is delivered to the valves through a hose running from the bottom of the tank.

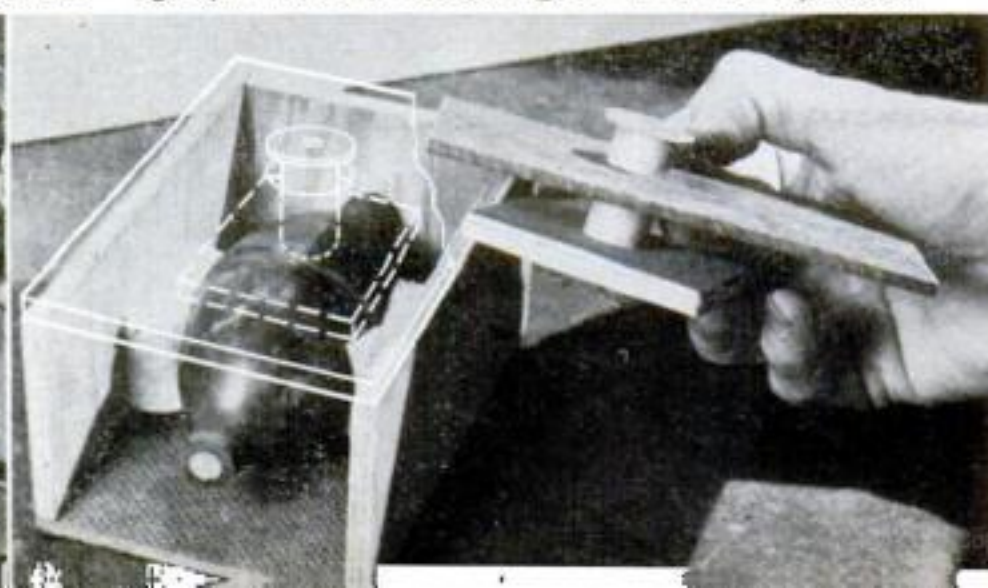
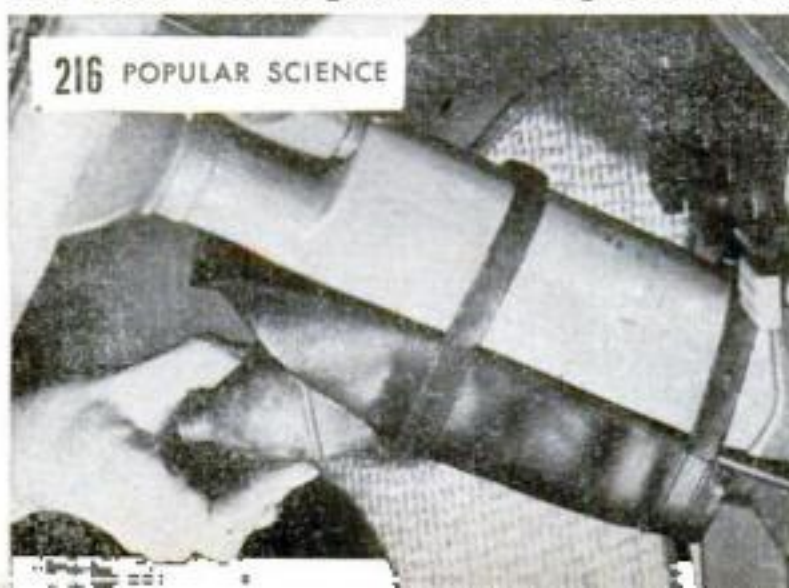
A good-sized glass jar could also serve as the tank, with the valve unit attached to the cap. Connect the water inlet to a small tube that runs through the cap almost to the jar bottom. Punch a small air hole in the cap.

Connecting the tubing. All joints must be good and tight, so put a dab of gasket cement on the nipples before forcing on the connecting hoses. Besides the delivery hose between the tank and valve unit, you need a long piece of rubber tubing between the valve unit and bulb control in the driving compartment. Run this through any convenient hole in the fire wall. Make a Y fitting and install this to divide the water discharge line to the nozzles.

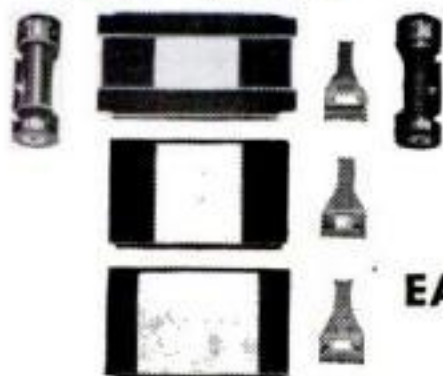
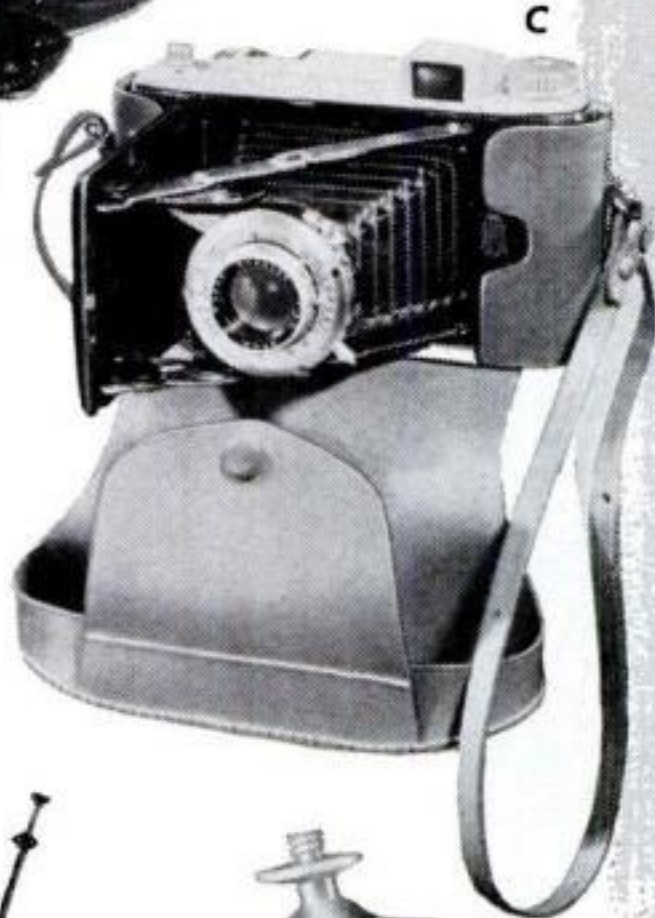
Installing nozzles. If it's a late model, your car may already have these. In that case simply connect the discharge tubes to them. If not, you can clamp two lengths of copper tubing, 1/8" o.d. or smaller, to the hood shelf—and let the nozzles emerge in the joint between the hood and cowl. Flatten the outlets slightly.

The bulb control. A bulb designed for an atomizer can be used to operate the washer. If the bulb has a valve or hole opposite the tubing connection, plug it so air can't enter here. Mount it either where you can squeeze it directly, or where some button or treadle can do it for you. The tank can be filled with a mixture of plain water and window-cleaning fluid, but water alone does nicely. Don't forget to drain the system in freezing weather. **END**

box could be put on floor for foot operation. Once the system is primed, pressing the bulb sprays water; releasing it fills the system.



Better pictures come easier with **KODAK** equipment



EASTMAN KODAK COMPANY
Rochester 4, N.Y.

A. Kodak Tourist "800" Camera—World's fastest between-the-lens shutter—the action-freezing Synchro-Rapid 800. Fast $f/4.5$ Lumenized lens; built-in exposure guide; new-type shutter release. Takes full-color pictures as well as black-and-white. Flash shots, too. Negatives, $2\frac{1}{4} \times 3\frac{1}{4}$. Perfect companion for a holiday or hunting trip . . . for any picture-taking occasion. \$95. Other *de luxe* models—with $f/4.5$ lens, $1/200$ shutter, \$71; with $f/6.3$ lens, $1/100$ shutter, \$47.50.

B. Kodak Auto-Release—Snaps your picture for you about 10 seconds after setting, so you can "get in the act." Fits any camera with a cable release socket. Double spring insures shutter tripping. \$4.25.

C. De luxe Field Case—"Tourist" looks better, carries better, handles better...and it's safer in this handsome leather case. Reinforced with steel frame. Opening in back shows exposure guide and window. Front flap removable. \$10.50.

D. Kodak Tourist Adapter Kit—Use it with your "Tourist" $f/4.5$ or $f/6.3$ and get pictures in 4 sizes! Accessory back and masks let you make miniature color slides, $28 \times 40\text{mm.}$; half 620, $1\frac{5}{8} \times 2\frac{1}{4}$; square 620, $2\frac{1}{4} \times 2\frac{1}{4}$; or full 620, $2\frac{1}{4} \times 3\frac{1}{4}$. \$14.50.

E. Kodak Metal Cable Release—Take shot after shot without jarring camera. Excellent for "T" and "B" exposures. Non-stretching braided metal won't kink. 7-inch size, \$.99. 12-inch size, \$1.17.

F. Kodapod—Slips in a pocket—gives rock-steady support when it's needed. Toothed jaws take a bulldog grip on tree, fence, or any wooden object. Other end threads into camera tripod socket. Ball-and-socket joint locks in any desired position. \$3.50.

Prices include
Federal Tax
where applicable

Kodak
TRADE-MARK

*You Can
Apply*

YOUR UPSON CEILING



**RE-COVER UNSAFE AND UNSIGHTLY
CRACKED CEILINGS WITH**

UPSON KUPER-KRAK PANELS



**FOLLOW THESE SIMPLE STEPS
TO NEW HOME BEAUTY!**

No need to suffer an ordeal of house-cleaning caused by re-plastering.

In a matter of hours, you can apply a modern characterful Upson ceiling that will be forever crackproof. Pebbled surface matches walls perfectly—takes paint beautifully. No visible face nailing. Amazing Upson Floating Fasteners anchor Upson Ceilings securely from back.

Hundreds of thousands now installed. Mail 10c now for 32-page Idea Booklet and free detailed instruction sheet.

THE UPSON COMPANY

738 Upson Point, Lockport, N. Y.

I enclose 10c for your 32-page Idea Booklet and free detailed Instruction Sheet for applying Upson Ceilings.

Name _____

Street _____

City _____

State _____



1 Nail furring on 16" centers, right over old plaster.



2 Nail Upson Fasteners to furring strips, 8" apart.



3 Clinch Fasteners. See Direction Sheet for simple method.



4 Apply mouldings supplied by your lumber dealer.



Gus and the Miracle Jeep

[Continued from page 164]

then cruise parallel to the shoreline. The car that continued to function the longest would win the competition.

As the voice went on, Stan remembered that he had read how the motors of Army trucks and cars had been waterproofed for landings on beachheads by coating their ignition systems with putty, goo, and a waterproof varnish. He also guessed now what Gus and Ted Stevens had been doing behind the "iron curtain." And he was sure of it when he recognized Ted Stevens as the driver of the second jeep from the left.

At a signal from the officer in charge, all five cars began to move toward the water's edge. With their three stacks extending above their bodies, they looked like so many waddling beetles. They all entered the water at about the same time.

The squad car stalled before the water had reached half way up its hood. It sputtered a few times and died. One of the jeeps stalled a minute or so after it got fully submerged. Within the first five minutes three of the cars were out of the race and their drivers were wading ashore. The remaining two cars—a jeep and the carryall—were now putt-putting up and down the shoreline. Then, finally, after about 15 minutes, the carryall conked out, and the winning driver piloted his jeep toward the shore. Even before the car was out of the water, Gus was on his feet.

"Let's get down on the beach," he yelled. "That's Ted's jeep."

Ignition Off, but Engine Runs

By the time Stan and Gus had clambered down the steep hill, Ted's jeep was up on the shore, still putt-putting away and surrounded by an amazed group of guardsmen and officers. The jeep's hood was up and they were peering down at a completely unwaterproofed ignition system. No goo, no varnish. The ignition switch on the dash wasn't even turned on, yet the engine was running fine.

When Gus shouldered into the group, Ted waved to him and gave him the now well-known first-finger-and-thumb circle that means success. Then to give added proof as to just how good his unit's unwaterproofed jeep was, Ted drove it out into the lake again, parked it under about four feet

[Continued on page 222]



SURPLUS MACHINE SHOP TOOLS

SET 12 Different Size High Speed Morse Taper Shank Drills up to 9/16" with No. 1 and 2 taper. \$4.95
1c \$10.00 value. Priced at only

SET 10 Different Size High Speed Morse Taper Shank Drills from 1/2" to 1 1/4". \$8.95
2c \$90.00 value. Priced at only

SET 10 Different Size High Speed Morse Taper Shank Drills from 1" to 2" with No. 3, 4 and 5 taper. \$39.95
3c \$180.00 value. Priced at only

SET 10 Different Size High Speed Morse Taper Shank Reamers up to 1 1/8". \$4.98
4c \$50.00 value. Priced at only

SET 8 Different Size Hand Reamers up to 3/8". Brand New. \$3.75
5c Priced at only

SET 8 Different Size High Speed Hand Taps up to 3/8". \$2.00
6c \$15.00 value. New and slightly used surplus. Priced at only

All merchandise is sold with a money back guarantee of satisfaction and is shipped postpaid.

T & T TOOL 111 W. Archer Tulsa, Okla.

ALTIMETER



Modernize your car. Fine desk ornament. Reads up to 20,000 feet. Fluorescent dial glows at night — no connections of any kind required — self contained — Suitable as a laboratory standard instrument — Same as used in airplanes. Brand new — cost gov't many times. \$3.50

Enclose sufficient postage — Excess will be refunded — No COD's

AIRCRAFT COMPONENTS, Inc.

360 Woodland Avenue Benton Harbor, Michigan

\$ FREE COURSE! BIG PROFITS! \$

Flocks & Sandblasts



Dual Purpose Spray Gun! Uses only 25 lbs. Air Pressure!

• Thousands of uses in Home, Shop, Industry: Makes Auto Interiors Clean & New, Lines drawers, Marproofs lamp bases, Refinishes any object. All in colorful Flock, Etch & Frost windows, glassware, etc. Removes Paint & Rust from Autos. Tools. Guaranteed! Send \$19.75 or write for free information. Complete Flocking Supplies!

BLASTO SPRAY GUN MFG.

Dept. PS-8, 7007 Haas Ave., Los Angeles 47, Calif.



ELECTRIC WELDER

AC or DC 110 Volts

"The Little Marvel" All-Metal welder. 5-year written guarantee. Welds 1/8" thick metal or money back. Repairs tanks, tools, fenders, machine parts, etc. Comes complete with everything — rods, unit, eye shield, and directions. We also make a welder for 16 to 22 gauge metal . . . \$3.95 complete. On C.O.D., postage extra.

\$645
Complete

ESSAY MFG. CO., Inc., Dept. 47, Quincy 69, Mass.

MODERN LAWN MOWER SHARPENER

FOR LAWN MOWER SHOPS FIX-IT SHOPS

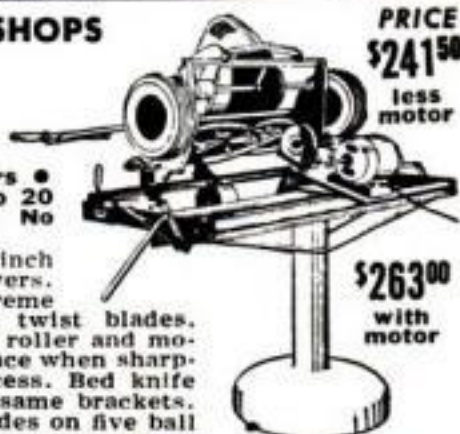
GOLF COURSES • PARKS
101 OTHER JOBS

Sharpens All Reel Type Mowers • Hand, Power or Gang • 10 to 20 Minutes • No Dismantling • No Extra Attachments Needed.

All reel type mowers, from 5-inch edgers to 36-inch power mowers, are quickly sharpened to extreme ends of both left and right twist blades.

Handle, wheels, roller and motor remain in place when sharpening is in process. Bed knife is sharpened in same brackets. Grinding head rides on five ball bearing races. Easy to operate.

Also sharpens chisels, joiner knives, planer blades. Big profit maker. Own your own business. Send Today for FREE Illustrated Bulletin No. 11-C1



PRICE
\$241.50
less motor

\$263.00
with motor

ORDER NOW

Immediate Delivery

MODERN MFG. CO. 160 N. FAIR OAKS AVE
PASADENA 1, CALIFORNIA

INSULATE YOUR ATTIC

FOR ONLY **\$37***

install it yourself!



*Based on average 5-room house

REYNOLDS ALUMINUM REFLECTIVE INSULATION

Put the magic of aluminum to work in your walls, attic! Reflects up to 95% of all radiant heat — throws off summer sun rays, keeps interiors up to 15° cooler; reflects winter heat back inside. Embossed aluminum foil bonded to tough kraft paper (foil on both sides for double air space; on one side, to face single air space). Clean, odorless, pliable, easy to tack or staple over ceiling joists or under rafters, between wall studs, under floor joists. Perfect vapor barrier. Fire-retardant. In rolls of 250 sq. ft., 25", 33" and 36" wide. Also

makes wonderful radiator reflectors, photographic light reflectors, etc. MAIL COUPON FOR FREE SAMPLES!

Aluminum Sheet for Rustproof Flashing, Termite Shielding, General Shop Work!



Reynolds Lifetime Aluminum in 50-ft. coils, 14", 20" and 28" wide, .019" thick; and flat sheet .019" and .024" thick, 28" x 6', 8', 10' and 12'. (20" coils also in embossed finish and .024" thickness.)

Aluminum Gutters—Rustproof, non-staining, half the price of other rustproof materials. Put them up yourself...slip joints, no soldering!

Aluminum Nails—Rustproof, never stain. Keep outside paint jobs clean without deep setting or puttying.



See your Building Supplies Dealer

MAIL THIS COUPON NOW!

Reynolds Metals Company
Building Products Division

2032 So. Ninth St., Louisville 1, Ky.

Send full information and FREE SAMPLES of Reflective Insulation. Also full details about Gutters & Downspouts ☐ Nails ☐ Flashing

Name _____

Address _____

City _____ State _____

Nothing like it!

The NEW MAGNA-TIP (PERMANENTLY MAGNETIC) SCREWDRIVER

with 10 times the "pull"

● Starts and completely drives screws in awkward or hard-to-reach places... with *one-hand* operation. Permanent Alnico magnet in shank charges bit with a "pull" TEN TIMES more powerful than ordinary "magnetic" screw drivers.

Interchangeable hardened tool steel bits (stored in handle) for four types of slotted and recessed heads. Handsome, chrome-plated finish with jet black handle. \$3.95 each complete at your hardware store or dealer's...or write us.

Magna Tool Corporation

Buffalo 3, N. Y.

SPECIAL OFFER to Hobbyists

ONLY
4⁹⁵

Hard Angle Jobs Set-up in 5 Seconds

Save TIME! MONEY! Drill, mill, grind, etc., round, square, irregular pieces at any angle. Quickly—Easily—Accurately with **PALMGREN "HOBB-E" ANGLE VISE**. Accurately machined and graduated, 1 1/2" Jaws, 1-Plain, 1-Grooved. Order NOW! Only \$4.95. Write for "Hobb-E-Tool" Circular.

CHICAGO TOOL & ENGINEERING CO.
8396 SOUTH CHICAGO AVE. CHICAGO 17, ILL.



MILLER ROTARY HI-SPEED (OPE-SAW) DRILL-BIT IT! SAWS & CUTS & REAMS



SAWS, CUTS, REAMS... sheet metal, angle iron, pipe, wood, plastic, Transite, etc. Amazing high-speed combination bit and saw fits any 1/4" or 1/2" electric drill or slow drill press; takes place of up to \$50 in tools. Drills own starting hole to quickly cut, saw or ream opening. Easy to operate. Ideal for carpenters, auto mechanics, electricians, plumbers, hobby workers, many others. Abrasive resistant high speed steel. No breaking. Will withstand severe continuous use. Resharpens at no charge. 1 1/2" diameter, overall length 3 1/2", cutting section 2" long with flutes ground from solid.

Send CASH, CHECK OR M.O.

ORDER NOW

\$3.95

Post-paid
Money back guarantee

INTERNATIONAL TWIST DRILL CORP.

Room 696 624 Wyandotte Kansas City 6, Missouri



NEW USES for your HOME POWER TOOLS!



Just off the press—our 1950 tool catalog, chockfull of new ideas to make your power tools more useful! Time-saving, power-driven tools you've never seen before—for sawing, sanding, polishing, grinding, routing, mortising, woodshaping, etc. If you own an electric drill, drill press, circle saw, or lathe, send for this valuable book today. Every tool illustrated. Send 10c to cover postage and handling.

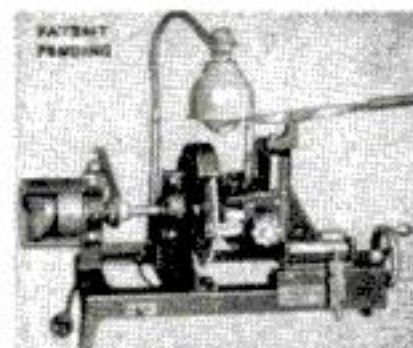
BERTRUM ENGINEERING & SUPPLY CO.
3121 MAIN STREET KANSAS CITY, MO.

KING MIDGET Home Assembled Auto

WORLD'S LOWEST PRICED CAR!

Drive for as low as 50c per week. Precision built parts direct from factory with beautiful all steel body. Get the facts on this amazing small auto—send 25c for detailed circular with large picture, 3 view drawings and price of all parts, or send \$1 (refunded first order) for this plus actual assembly book with 42 photos, drawings: blueprints of snow, ice conversions. Ideal for micro-midget racing—Get this information.

MIDGET MOTORS MFG. CO.
ATHENS 2, OHIO



Start a NEW BUSINESS!

or Add to your present
Repair Business

**SHARPEN DULL PIPE WRENCHES
PIPE TAPS & DIES
"GUM" CIRCULAR SAWS**

Write for Information
J. C. MOORE INDUSTRIES
BOX 5 276, Fredonia, Pa.

DRAINS CELLARS, WASH TRAYS CIRCULATES OIL

Pumps 1800 GPH 300 gal. 30' high, uses 1/8 to 1/2 HP motor. Will not clog. **\$6⁵⁰**

Postpaid if cash with order.
(Add 50c for west of the Mississippi.)

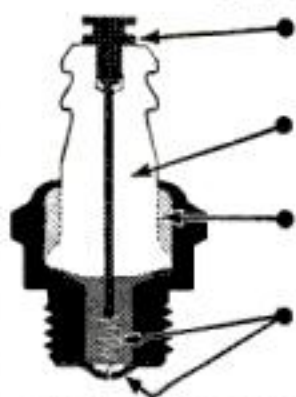
Thousands in use since 1936

LABAWCO PUMPS, BELLE MEAD 3, N. J.



CHAMPION V-GLOW PLUGS

for model engines only



CHAMPION TERMINAL—assures better center electrode seal and provides sturdier electrical connection.

CHAMPION-CERAMIC INSULATORS—proved dependable in millions of Champion Spark Plugs.

CHAMPION SILLMENT SEAL—prevents excessive compression leakage between insulator and shell.

CHAMPION "THERM-O-FLEX" CONSTRUCTION—longer element life, more dependable performance.

Follow recommendations of plug types and fuels approved by engine manufacturer.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, O.



Once Again Dependable

CHAMPIONS

Win In Indianapolis "500" Mile Race



BE A CHAMPION DRIVER . . . Follow The Experts in Their Choice of Spark Plugs



Once again the checkered flag brought a Champion-equipped car into the winner's circle in the 1950 Indianapolis Speedway Classic, for the 19th time. 7 out of the first 10 cars used dependable Champions.



Johnny Parsons, winner, and 1949 AAA Champion, set a new record with an average speed of 124.002 miles per hour for the 345 miles of the race—cut short by rain. Johnny always uses Champions.



If you tested spark plugs as exhaustively as the race driver, you would know that Champions insure the utmost in performance and dependability. The majority of these experts use Champions.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

Listen to the CHAMPION ROLL CALL . . . Harry Wismer's fast sportscast every Friday night, over the ABC network

AUGUST 1950 **221**



HERE'S the quick easy way to build your own handy workshop. A place where you can keep your tools and do repairs without interruption. Pick a corner of your cellar, or perhaps the garage. Nail up big sturdy panels of Gold Bond Gypsum Wallboard to a rough lumber framework or over the old material. Lightweight, fireproof panels of Gold Bond Gypsum Wallboard saw like lumber, won't warp, swell or contract. Decorate with Gold Bond Sunflex, the low cost wall paint that dries in one hour.

Available at your local Gold Bond lumber and building materials dealer!

NATIONAL GYPSUM COMPANY
BUFFALO 2, NEW YORK



5 big-capacity
power tools
in
1 precision-
built unit



Write for free, 16-page, profusely illustrated book.
SHOPSMITH, Dept. 128-A, 12819 Coit Rd., Cleveland 8, O.

**Your weight does the work
with a "YANKEE"**

**QUICK-RETURN SPIRAL
SCREW DRIVER**

● Save your wrist: drive and draw screws faster. Just push on a "Yankee" 130A Spiral Driver. Your weight and the spiral turns the screw without blisters or fatigue. Quick-return spring in handle holds blade in slot and returns the handle after every stroke.

**NORTH BROS.
MFG. CO.**

219 West Lehigh Ave.
Philadelphia 33, Pa.



★
Write for the
"YANKEE"
Tool Book
...FREE...

"YANKEE" TOOLS
NOW PART OF

STANLEY

THE TOOL BOX
OF THE WORLD

Gus and the Miracle Jeep

[Continued from page 218]

of water, and swam ashore. The engine continued to run. After a few minutes he swam out again, and drove it back up on the shore to the cheers of the crowd.

"Okay, miracle man," Stan kidded after they'd got back to Gus's car and had started the drive back to the garage. "How did you master-mind that one?"

"I didn't master-mind it," Gus replied. "It was Ted's idea; I just helped out with the details and some of the work."

"Okay, okay," Stan said impatiently. "So what's the gimmick? Automobile ignition systems just don't work when they get wet. And besides, the ignition switch on that jeep wasn't even on. What did you do, stow away gremlins in the crankcase to push the pistons up and down?"

"Ever hear of a Diesel?" Gus asked.

"Of course I've heard of a Diesel, but what's that got to do with a gasoline engine in a jeep?"

The Curtain of Mystery Is Lifted

"It's just a matter of principle," teased Gus. Then, just before Stan really blew his top, he continued, "The whole thing goes back to Ted's war experiences, when he was attached to the motor corps of the 213th Medical Battalion of the 96th Infantry.

"During training, he was stationed at a camp near San Luis Obispo in California. With the rest of his gang he'd been taught the approved way of waterproofing cars for beach landings. Then one day two Corps vehicles showed up at the camp, a jeep and a carryall. They didn't have any waterproofing, so far as the ignition systems were concerned. Still they outperformed all the regular Division cars when it came to underwater operation.

"Ted's always been an inquisitive kid," Gus went on, "so he asked questions. The underwater trick, he learned, consisted of drilling one-eighth inch holes, one and one-sixteenth of an inch deep, into the centers of brand-new intake valves. With those holes in place, the engine, after it had been started and warmed up, no longer needs a conventional ignition system."

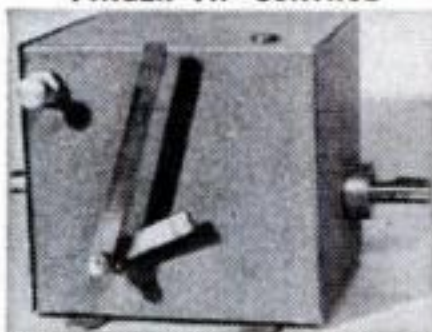
"I still don't get it," Stan said. "How in the heck can holes drilled in an engine's intake valves take the place of the hot sparks from spark plugs?"

[Continued on page 224]

HYDRAULIC Power Transmission

WITH Infinitely VARIABLE SPEEDS, Clutch and INSTANT REVERSE
OUTPUT TORQUE ADJUSTMENT UP TO 180 inch POUNDS

FINGER TIP CONTROL



Shipping Wght.
25 pounds

Only
\$54.50

Prepaid in U.S.A.

2 quarts oil
included FREE

This positive displacement Hydraulic Torque Converter is the ideal fluid drive with thousands of uses. Output Speeds Infinite .0 to 550 R.P.M. in either direction. Change Speeds WHILE RUNNING. Control and Transmit your power this SMOOTH Oil-Way. Will handle 1/4 H.P. to 1 1/2 H.P. Motor. Industrial or Home & Farm Use. Cost Government \$300. High Quality Precision Workmanship. Buy this unit to get the most for your money. Case measures 7 1/2" long 7" high 6 1/2" wide. Input & Output Shafts 3/4" dia. Beautiful Red Crackle Finish Case.

If C.O.D. is requested a 10% Deposit must accompany order and we ship F.O.B. Chicago.

1 1/2"-8 thread Lathe
Chuck Adapter, \$3 extra

DIRZIUS MACHINE SHOP "Q" 1423-25 So. 52nd Ave., Cicero 50, Ill.

END GENERATOR REGULATOR TROUBLE!!

REPLACE YOUR CAR VOLTAGE REGULATOR WITH AMAZING Wattage EMERGENCY DRIVE WITHOUT BATTERY GUARANTEE NEW SCIENTIFIC DEVELOPMENT!!!
THERMO-AUTOMATIC CHARGING RATE - HIGH FOR WINTER TO INCREASE OR DOUBLE THE LIFE OF YOUR BATTERY, GENERATOR AND IGNITION - TO KEEP BATTERY AT TOP CAPACITY AND GIVE YOUR CAR THAT TOP NEW CAR PERFORMANCE - STATE MADE AND PROOF OF CAR AND JENSEN FOR FREE BULLETIN AND NOW YOU COULD ENJOY THROTTLE-TOE PERFORMANCE

SCIENTIFIC ELECTRIC CO. CLEVELAND 8, OHIO P.O. BOX 2142-F

NEW! MINIATURE DUST MASK

Wear when sanding, grinding, paint spraying, sweeping, dusting, furnace cleaning, etc. Handy as a pair of glasses. Just keep mouth closed and breathe through nose is all you do to operate. Protects against dusts, lint, coal, cement, grain dust. Has 9 sq. in. filter.

Order today.

JERRY BRYANT, Dept. PS, 919 N. Michigan Ave., Chicago 11, Ill.

Order Today \$1.00 POST PAID

6 POWER BINOCULAR
Pocket Size—weighs only 4 oz. Field of 370 ft. at 1000 yds. Precision constructed PRISM Binocular, NOT a Field Glass. Lightweight metal. Black & Chrome finish. Carries United Seal of Quality. COATED! Achromatic lens. Leather case, straps. UNCONDITIONAL MONEY BACK GUARANTEE. Pay postman plus postage. Cash orders ppd. Add tax. United Binocular Co., Dept. ARF-2816, 7941 S. Halsted, Chicago 20. (Dealers Wanted).

\$19.50

HANDY CALCULATOR FOR WOODWORKERS.. ONLY 10c
Just set dial, quickly solves countless problems. Converts linear to board feet, compares workability of various woods, shows bit sizes, nail specifications. Also tool sharpening tips, etc. 6" diameter heavily varnished cardboard. Send 10c to Greenlee Tool Co. 2128 Columbia Av., Rockford, Ill.

GIGANTIC SURPLUS SALE

110-VOLT, AC POWER PLANTS AND HUNDREDS OTHER ITEMS

• Brand new top quality 110-volt, 60-cycle, 2500-watt portable Power Plant. Complete in original crate with full kit of tools and spare parts. (Only 139 units available.)

• Ideal plant for farmers, sportsmen, contractors, etc. Plant will run motors up to 2 h.p. Fully guaranteed to satisfy.

• Order from ad or send today for complete sales catalog. Other "buys" include air compressors, paint spray units, motors, binoculars, electric drills, etc.



Govt. Cost over \$600
\$279.50
PREPAID

BURDEN SALES COMPANY
830 "O" ST. LINCOLN, NEBR.

when you use pliers...



you need CHANNELLOCK

There are lots of "fussy fix-it" jobs around the house that Dad, Mom or the kids can easily do when Channellock pliers are handy. No matter what—electrical, automotive, plumbing, battery, or anything mechanical—you need Channellock pliers.

Channellock's patented tongue and groove joint gives you these "plus" features: Greater Strength, Longer Wearing, Self-Cleaning, Closely-spaced Adjustments, Visible Adjustment, No Wear on Joint Bolt.

CHAMPION DEARMENT TOOL CO.
MEADVILLE, PA.



Only CHAMPION DEARMENT MAKES

CHAN NEL LOCK

TRADE MARK REG.

U. S. PATENT OFFICE

Snap-on*

ANGLE HEAD WRENCHES



\$9.55
Postpaid
Add Local Tax

7 Sizes $\frac{3}{8}$ " to $\frac{3}{4}$ "

FOUR USABLE WRENCH POSITIONS IDEAL FOR USE IN CLOSE QUARTERS

Heads are set at 30° and 60° angles. Both openings are same size. By switching ends you can turn nuts in narrow swing areas where standard wrenches cannot operate. Hammer forged from finest alloy steel. Special Snap-on heat treating process toughens and hardens wrench from skin to core. Thin blade. Heavy chrome plated. Satisfaction guaranteed or your money back.

*Snap-on is the trade-mark of the Snap-on Tools Corp.

**ORDER
NOW!**

SNAP-ON TOOLS CORPORATION
8060-H 28th Ave. Kenosha, Wisconsin

I enclose () Check, () Money Order for one set of angle head wrenches V-807K \$9.55 postpaid.

NAME

ADDRESS

CITY STATE

\$ MAKE MORE MONEY FILING SAWS \$

EARN \$6 AN HOUR WITH THIS MOTOR DRIVEN BURR SAW FILER

It does a better, faster and easier filing job. No time killing adjustments necessary. . . the accurate operator-controlled file arm will file from both sides. Gives a lifetime of

service and has a 1 year guarantee. FREE FOLDER ON REQUEST.

WRITE FOR VALUABLE BOOK

Send 25c in coin for Burr's Blue Book of saw shop charges and other valuable information.

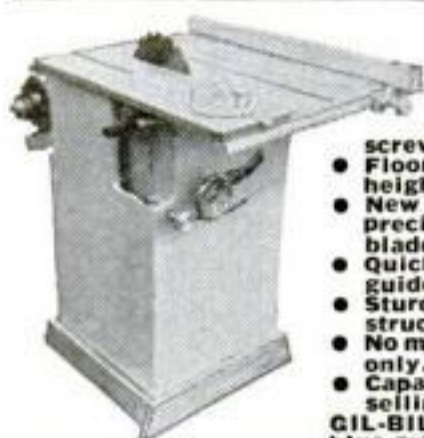


SAW SHOP
CHARGES
Coast to Coast

BURR MFG. CO., Dept. 8, 8943 Venice Blvd., Los Angeles 34, Calif.

BUILD YOUR OWN TILTING ARBOR SAW!

**SAVE
\$50
OR MORE**



- 27x28 in. table stays level. Blade tilts full 45 degrees.
- 10 in. blade cuts 31 1/2 in. deep, jack-screw depth adjustment.
- Floor model, 34 in. table height.
- New Departure ball bearing arbor, 3/4 in. precision shaft, ready to run, 5/8 in. bore blades.
- Quick-positioning, self-aligning rip fence guide.
- Sturdy wood, steel and aluminum construction.
- No machining—build easily with hand tools only.
- Capacity and performance of floor saws selling for \$150.00 and up!

GIL-BILT Step-by-Step pictorial plans (No blue-print reading required), full scale patterns, 11 actual photographs. \$1.00

GIL-BILT Metal Parts Kit includes Plans, ball-bearing arbor, cast aluminum miter gauge and bar, rip fence guide, machined lock knobs, jackscrew mechanism with 4 1/2 in. handwheel, and all other metal parts including every screw, bolt, nut and washer (less blade) \$20.95

Same Kit with 10" combination blade. 24.90

Same Kit with 8" combination blade. 23.90

Return Kits in 10 days for refund if not satisfied.

(Prices include postage up to 600 miles)

Also available—Plans and Metal Parts Kits for 8" Tilt/Table Saw and 12" Band Saw. Order Plans at \$1.00 each—sent postpaid anywhere in the world, or write for FREE descriptive Catalog.

GILLIOM POWER TOOLS

P. O. Box 1-UH, Lambert Field
St. Louis 21, Missouri

Gus and the Miracle Jeep

[Continued from page 222]

"That's what I meant about the Diesel," explained Gus. "The simplest Diesel engine—some people call them semi-Diesels—have hot spots in each cylinder to take the place of spark plugs. The hot spot, a knob or button of metal that retains its heat, keeps hot enough to fire the air-fuel mixture after each compression stroke.

"The same thing's true of the holes we drilled into the intake valves of the engine in Ted's jeep. After a little normal running with the jeep's regular ignition system, those holes got filled at the bottom with a deposit of carbon. Carbon retains heat, so, after a normal start with the regular ignition system, the 'carbon spark plugs' continued to do the firing, so it didn't matter if the ignition system got wet and conked out. As a matter of fact you saw Ted switch his ignition off once the engine had reached its normal operating temperature."

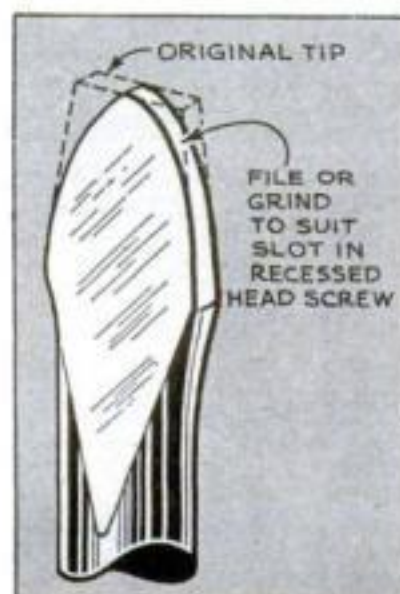
"Mind if I ask a couple of \$64 questions?" put in Stan. "If that system works so well, how come the Army didn't adopt it instead of waterproofing? And why don't they just do away with the conventional electric ignition systems on all cars?"

"Well, in the first place," Gus explained, "it's not a particularly efficient ignition system for general use and, besides, you have to have a conventional ignition system to run the engine until the carbon spots heat up. Then there's no way to control the firing of the cylinders, so the engine is always out of time. As a result, you lose power, have a rough-running engine, and waste gasoline.

"It was just a trick the Army tried and then abandoned," Gus added. "But it was good enough to help Ted and our National Guard unit win this afternoon." **END**

Driver for Recessed Screws

If you get caught short for a screwdriver for screws with recessed heads, file or grind an ordinary screwdriver as shown in the sketch at the right. Afterward, you can dress the blade back to its normal shape. — Arthur R. Christensen, Lockport, N. Y.



DREMEL'S STRAIGHT-LINE ACTION GUARANTEES SCRATCH-FREE SURFACES

Here's fast cutting, finish sanding at its best. Dremel introduces a new electric sander, sturdily built to withstand hours of continuous use. It is light in weight... will not tire operator. Its **straight-line (non-rotary) action** leaves no scratches, no rotary marks—just satin-smooth surfaces ready for any type finish. Here, for the first time, is an electric sander built for years of faithful service—all at the remarkably low price of **only \$24.50**.

A POWERFUL, FAST CUTTING TOOL FOR CRAFTSMEN, HOME and INDUSTRIAL USERS

Craftsmen find this new Dremel model has the extra stroke and power needed for heavier woodworking projects such as cabinet-making, boat building and refinishing, garden furniture, etc. Home-owners say it's just the tool for preparing surfaces for painting and varnishing—for refinishing walls, woodwork, furniture, dry wall joints, siding and other surfaces. The Model 2000 also does a professional job of polishing waxed surfaces—eliminating all the back-breaking labor on cars, furniture, floors, stairways, etc. Industrial users likewise find this new Dremel Sander a faithful performer in furniture, cabinet, building and body shop operations.

RUGGED DESIGN and PERFORMANCE FEATURES

- Only two moving parts—requires no oiling.
- Reciprocal (straight-line—non-rotary) action leaves no marks...cannot burn surface.
- 21 square in. sanding surface speeds production...14,400 cutting strokes per min.
- Cam-type holder permits changing paper in seconds.
- Die-cast aluminum housing with moulded Bakelite cover...Light weight, only 5 pounds.
- Over-all size 3 1/8" wide, 4 1/2" high, 7" long.
- 8 ft. Underwriter's Approved cord...uses 110-120 v. A.C.

ONLY
\$24.50

WITH STEEL
CARRYING CASE
AND COMPLETE
ACCESSORIES

14,400
Sanding
Strokes
Per
Minute



(PATENTED)

PRICE INCLUDES STURDY CARRYING CASE

Perfect portability of Sander, cord, abrasives, and polishing pads is provided in this sturdy, 3-shelf metal storage case. Price also includes 25 assorted sheets abrasive paper and a high-grade sheepskin polishing pad.



DREMEL Model "A" SANDER-POLISHER OVER 200,000 NOW IN USE!

A lighter-capacity Sander that takes all the work out of home or hobby projects. Popular with women for polishing furniture, etc. Same design and construction features as larger model. Furnished in attractive cardboard box. If your dealer can't supply, order direct from factory.



\$14.85

DREMEL Electric COPING SAW

CUTS SCROLLS LIKE MAGIC—SANDS AS IT SAWS



BLADE
FACES
4 WAYS

JUST
GUIDE IT!

Only
\$5.85

SAFE! AS A HANDSAW

For home, hobby, repair work—no other tool pleases so much for so little cost. Works in any direction—delivers 7,200 strokes per minute smoothly, effortlessly. Saws through 3/4" medium-hard wood at a foot-a-minute speed. Touch-of-the-trigger, foolproof action. Only 2 moving parts, never needs oiling. Uses 110-120 v. A.C.

FREE
PROJECT
PLANS

MOTO-TOOL—THE POCKET-SIZE MACHINE SHOP



MOTO-TOOL KIT NO. 2
With 23 Accessories (High Speed Steel Cutters, Grinding Wheels) **\$23.50**.
MOTO-TOOL NO. 2 (only)
with one emery wheel point **\$16.50**.

Moto-Tool is the most versatile tool you can own—grinds, routs, drills, carves, engraves, polishes, etc. Look at these features: Approx. 27,000 R.P.M. • Dynamically balanced armature eliminates vibration. Oilless (oil-sealed) bearings • Dust-filtered air-cooling system • Weighs 13 oz. • Uses 110-120 v. A.C. • Used in plants of General Electric, Ford, Remington Arms, Nash-Kelvinator, etc.

Don't confuse Moto-Tools and Accessories with so-called "bargain offers." Compare Dremel feature for feature with competitive tools. If our products are not superior in every way, we don't want you to buy.

Portable DRILL PRESS

Only
\$9.95

(Less
Moto-
Tool)



WHERE TO BUY DREMEL TOOLS



Dremel Tools are sold everywhere. If your dealer cannot supply you, send remittance in full and we will ship postpaid. Or send only \$2, and pay postman balance plus postage and fee. **Money back if not delighted after 5 days' trial.**

DREMEL MFG. CO., Dept. 120-H, RACINE, WIS.

WELD BRAZE, SOLDER, and CUT →

ONLY
\$9.95
F.O.B.
complete!

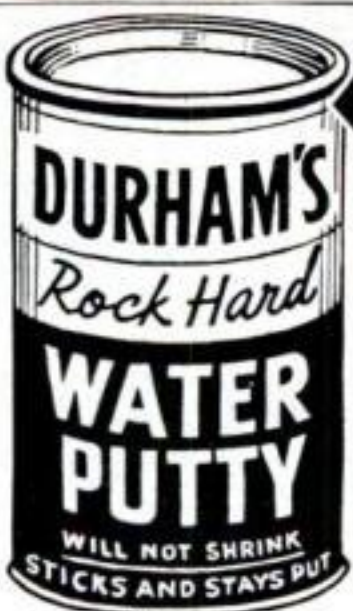
EASILY...
QUICKLY!



ORDER
NOW
10 DAY
TRIAL

No experience needed. Follow simple instructions, weld on iron, steel, bronze, brass, aluminum, and other metals. Plugs into any properly wired 110 volt A.C. or D.C. line. Make or save time and money doing repair work for yourself and others. Repair men, farmers, tinsmiths, home and auto owners, hobbyists, etc., say **FOUR-WAY** pays for itself over and over. Order today or send for Free details.

FOUR-WAY WELDER COMPANY, Dept. F3-HA
2326 So. Michigan Ave. • Chicago 16, Illinois



The Modern PLASTIC for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. If unobtainable from your lumber, paint or hardware dealer, the big 4-lb. can will be sent you postpaid (in U.S.) for only \$1. Full money-back guarantee, order now.

DONALD DURHAM CO.

Box 804-T, Des Moines, Iowa

AUGUST 1950 225

USE YOUR ATTIC

Install the PRECISION folding stairway YOURSELF

Fits all ceilings. Just saw the hole in your ceiling—frame the hole with 2x6's, nail the stairway in place and cut off the stairway at the calibrated ceiling height. The Precision Stairway is simple and easy to operate. No springs, actuated by counterweights, it's perfectly balanced, raising or lowering easily with one hand. Composition safety treads on steps. Insulated door panel. Requires no attic space. Made of No. 1 kiln dried poplar with cast brass hinges, heavy cast aluminum rocker arms and brackets. Approved by F.H.A. everywhere

See your local lumber dealer or write direct today.

Manufactured by

PRECISION PARTS CORP.
Nashville 7, Tennessee

Mechanics of Farming



By Ladd Haystead

■ Growing into the hottest farm story of the year is the rising use of NH_3 (anhydrous ammonia) as fertilizer. It will probably be applied to a total of somewhere around three million acres in about 12 states this year, as against none just four years ago. One problem has been how to plant the gas successfully four or more inches below the soil. Work on applicators, principally at Mississippi State College, has now resulted in models (see picture) with stain-



less steel fittings to avoid corrosion, more accurate metering, and even distribution. The gas fertilizer contains 82 percent nitrogen as against around 30 percent for the dry types. Claims for it include cheaper fertilization, lower labor requirement, faster placement, and greater availability of plant food.

■ A three-wheel power mower that you can ride like a motor scooter while cutting the grass is announced by Belknap Mfg. Co., Bridgeport, Conn. Price: about \$170.

■ University of California plant scientists have produced lemons two and three times larger than normal with a plant regulator known as 2,4,5-T (Monsanto Chemical Co., St. Louis). It also delayed yellowing on the tree and in storage, and prevented ripe lemons from dropping.

■ Individual 'greenhouses' for plants, made of plastic and called Raydomes, are offered by General Plastics Corp., Marion, Ind. The

SAFE
JIG
SAW

SYNCRON
ELECTRIC

READY—basic tool for Dad's workshop yet so safe small children may use! Cuts ANY length $\frac{1}{2}$ " wood, thin metal, plastic. Stroke easily adjustable. No oiling, gears, belts. With BUILT-IN MOTOR, 3 blades, cord, plug \$17.50 at dealers or postpaid from SYNCRON Corp., Dept. G-80, Oxford, Michigan.



\$17.50

REMEMBER IT'S DANGEROUS to pay less if you want safe balanced matched tires. Hundreds of thousands of folks in U. S. have sent their money in advance, assured by satisfied friends, that we will never break faith.

GOOD YEAR **Firestone**

GOODRICH, UNITED STATES, GENERAL, FISK, KELLY & OTHERS
Our policy is to select your tires so carefully, as if our very future depended on the service given by that particular tire.

FREE TUBE WITH EVERY TIRE | ORIGINAL GOOD TREAD JUST SLIGHTLY WORN | NO RECAPS NO RETREADS

*****GRADE, 16 MONTHS GOLDEN RULE GUARANTEE BOND

600-16	\$4.19	700-15	\$4.50	650-20	\$7.90	32x6 (8)	\$8.60
650-16	4.65	670-15	4.75	700-20	8.50	32x6 (10)	10.75
700-16	5.20	710-15	5.20	750-20	8.60	900-20	13.40
650-15	4.40	550-17	4.65	825-20	14.25	1000-20	14.20

DELUXE GRADE, 26 MONTHS GOLDEN RULE GUARANTEE BOND
THIS GRADE MADE THE BLATT NAME "WORLD FAMOUS."
TAKE \$2 off the price of each deluxe grade tire. If you do not wish the tube.

600-16	\$7.35	650-15	\$7.75	MATCHED BALANCED TRUCK TIRES			
600-16 (6)	7.95	670-15	7.75	600-20	\$10.95	900-20	\$16.75
650-16	7.95	700-15	7.95	650-20	11.25	1000-20	17.50
700-16	7.95	710-15	7.75	700-20	11.95	1100-20	18.50
750-16	8.75	760-15	8.35	32x6 (8)	12.50	1200-20	19.50
550-16	7.25	820-15	8.00	32x6 (10)	13.75	1000-22	16.75
550-17	7.75	475-19	7.45	750-20	13.50	1100-22	17.50
525-18	7.35	550-19	7.95	825-20	17.50	750-15	11.95

MILITARY★★★★★ Guar. 30 Mos. (Supers 14 Mos.) Rugged 45,000 Miles

600-16	Super \$5.45	150-16	Super \$9.75	900-16	Super \$7.44	750-20	Super \$7.45
★★★★	6.45	★★★★	10.95	★★★★	9.65	★★★★	10.45
Rugged	7.45	Rugged	12.22	Rugged	10.75	Rugged	13.95

BLATT GIRARD & LANCASTER AVES.
DEPT. PS. PHILADELPHIA 31, PA.
Send check or money order and this ad for rush shipment. We won't ship a tire we wouldn't use ourselves. The name to trust in rubber.

GROBAN'S BRAND NEW WAR SURPLUS SPECIALS! UNCONDITIONALLY GUARANTEED

Brand New

AUXILIARY ELECTRIC GENERATING PLANT

For General Utility and Emergency Use

2500 watts • 115 volts
60 cycles A.C.

Plenty of current to operate your:
Oil Burner, Sump Pump, Refrigerator, Home Freezer, Power Saw, Lights, Radio and Television, Home Water System Pumps.

(ITEM #88)

Complete integrated heavy duty electric power plant, Signal Corps Model PE-75, driven by Briggs & Stratton, one cylinder 6½ H.P. Model ZZ, 4-cycle engine with killer button, oil bath air cleaner, governor, muffler, starting rope, and radio interference filter. The self-excited Leland or Westinghouse generator is rated 2500 Watts, 115 Volts, 60 cycle A.C. single phase, belt driven, with guard and duplex receptacle. When generator is not in use, you can use the engine separately to power other equipment. Mounted on adjustable steel skids, notched for carrying poles. Net, wt. 310 lbs. Shpg. wt. 440 lbs. Dimen. 36" x 19½" x 24". 12 month guarantee. \$726.00 value. **NOW 295.00** F.O.B. Chgo.

Excellent Hydraulic VALUES!

HYDRAULIC CONTROL VALVES

ITEM #24. Four-way control valve with built-in relief valve, for use with one double action hydraulic cylinder, may be used with 1500 P.S.I. hydraulic system to open and close hydraulic cylinders. Ship, wt. 8 lbs. A \$38 value, **7.95** postpaid.

ITEM #26. Four-way control valve for use with two hydraulic double-action cylinders. Each cylinder may be operated independently of the other or in conjunction with the other. Oil may be locked in any of the cylinders to hold the piston at any required position. Ship, wt. 6 lbs. A \$60 value, **10.95** postpaid.



VICKERS HYDRAULIC TRANSMISSION

MODEL AA16801A Ideal for lathe drive, miniature cars, power machinery, gearing, etc. Rated 2 HP maximum input at 3750 R.P.M. Output speed continuously variable from 0 to 1½ of input speed in either direction. Self contained reservoir. All controls external. Even power at all speeds. Complete with two 1½" shafts with flat for pulley attachment. Shpg. wt. 20 lbs. Gov't. acquisition cost \$325.00. A tremendous value at **25.00** (ITEM #85) (F.O.B. Chgo.)

Hydraulic Cylinders-Air or Oil

Large supply of new labor-saving, economical hydraulic equipment in many types and sizes. Use these positive, highly efficient, smooth pressure hydraulics on presses, arbors, lifts, loaders, power control, positioning, brakes, plastic dies, auto frame alignment, etc., etc.

ITEM #4-All steel double action hydraulic cylinder. 1½" bore, 2½" stroke. Clevis mounting. Will lift 1000 lbs. with 1000 P.S.I. line pressure. Perfect for positioning and feeding movements. Shpg. wt. 4 lbs. F.O.B. Chicago **4.95**

ITEM #33C-Double action hydraulic cylinder. 1½" bore, 4½" stroke. Clevis mountings at both ends. Uses 1½" pipe fittings. **8.95** Postpaid

ITEM #32-Double action, 1½" bore, 9" stroke, will lift 1760 lbs. with 1000 P.S.I. line pressure. **10.95** Wt. 4 lbs. A \$45.00 value. **Postpaid**

ITEM #41-Double action hydraulic cylinder, 2" bore, 6" stroke, clevis mounting at base and end of shaft. Overall length closed 12½". Has ¾" stainless steel shaft, uses 1½" tubing fittings. Will lift up to 3100 lbs. with 1000 P.S.I. line pressure. Weight 7 lbs. **12.50** Postpaid

ITEM #16-Double acting cylinder. 1½" bore, 27" stroke. (Will lift 1760 lbs. with 1000 P.S.I. line pressure. Wt. 8 lbs. A \$55.00 hydraulic cylinder value for only **12.95** Postpaid

ITEM #15-Double acting cylinder, 3" bore, 8½" stroke. All steel hydraulic cylinder, will lift up to 7000 lbs. with 1000 P.S.I. line pressure. Wt. 12 lbs. A \$78.00 value, **19.50** Postpaid

ITEM #31-Double acting cylinder, 3½" bore, 11" stroke. Will lift 9600 lbs. with 1000 P.S.I. line pressure. Wt. 15 lbs. A \$92.00 value. **22.50** Postpaid

ITEM #40-Double action, 3½" bore, 20" stroke. Rated lift capacity 9600 lbs. with 1000 P.S.I. line pressure. Clevis mounting, aluminum alloy barrel with 1½" stainless steel shaft and piston. Wt. 20 lbs. A \$125.00 value. F.O.B. Chicago **25.00**

ITEM #42-Double action hydraulic cylinder, 4" bore, 18" stroke. Rated lift capacity with 1000 P.S.I. line pressure is 12,500 lbs. Ship wt. 30 lbs. F.O.B. Chicago. An Excellent Buy for **32.50**

HI-PRESSURE FITTINGS for cylinders and valves available at 35c ea. for ¾" pipe and 50c ea. for 1½" pipe.



G-I STAINLESS STEEL TANK

Use these tanks on compressors, for tire inflators, pulsation chambers, floats, buoys, hydraulic reservoirs, fluid and milk containers, fuel containers, etc. Tough, light, shatterproof. 450 P.S.I. Aviator's Breathing Oxygen bottles, type threaded openings at ea. end. Wt. 19 lbs. (ITEM #63) **4.95** Price F.O.B. Chicago

(ITEM #63)

G-I, 2100 cu. in. (approx. 9 gallons) int. vol. 24"x12", 1½" threaded openings at ea. end. Wt. 19 lbs. (ITEM #63) **4.95** Price F.O.B. Chicago

NEW! STATIONARY OR PORTABLE (ITEM #65)

D. C. ARC WELDER

250 AMPS. MODEL 252

FOR ANY WELDING JOB,
LIGHT OR HEAVY

Stop Costly Repair Bills,
Weld It Yourself and Save



Only one or two jobs will pay for entire welder.

Designed for many years of trouble-free service. Handles anything from light gauge sheet metal to ½" plate. This precision-engineered Direct Current ELECTRIC ARC WELDER is offered at but a fraction of its original value. It can be mounted permanently or easily transported for portable use. Does the job instantly, where and when you need it. The War Surplus generators for these Arc Welders were built by General Electric, Westinghouse, and Delco-Remy at a cost of over \$300.00. They are light in weight; have oversized lifetime grease-sealed ball bearings; air-cooled commutator; dial type rheostat for easy pinpoint control; high-low range switch; reactor coil for even arc; handles 1/16" to 1/4" rods. Run welder at 2500 R.P.M. from drive pulley or power take-off of tractor, a 7½" H.P. electric motor or a 10 H.P. gas engine. Use two V-belts, or flat belt (on pulley). Continuous welding rating-200 amps.; intermittent rating-250 amps.; 0-30 volts. Now... AT A FRACTION OF ITS VALUE. Price includes double V or flat belt pulley and instruction book. Ship wt. 107 lbs. **99.50** F.O.B. Chicago

ACCESSORY KIT including welding helmet, electrode holder, two 10 ft. cables with clamp and 5 lbs. of assorted welding rods. (ITEM #66) **10.50** F.O.B. Chicago

Remember. Satisfaction is Guaranteed

DIRECT CURRENT GENERATORS



For welders, plating, truck and marine use, D.C. appliances, lights, etc. Aircraft quality-lifetime grease sealed ball bearings. Heavy duty.

ITEM #89-Type M-2, rated 50 Amps.-24 Volts. Mfd. by Leece-Neve Co. Shpg. wt. 32 lbs. Gov't. Acq. Cost \$176.00. **16.50** F.O.B. Chicago

ITEM #90-Type P-1, rated 200 Amps.-28 Volts, 2500 R.P.M. Mfd. by General Electric, Ford, Delco-Remy and Westinghouse. Gov't Acq. Cost \$300.00. Shpg. wt. 54 lbs. F.O.B. Chicago **22.50**

ITEM #91-Type R-1, rated 300 Amps.-30 Volts. Mfd. by Jack & Heintz. Gov't Acq. Cost \$380.00. Shpg. wt. 70 lbs. F.O.B. Chicago **35.00**

EMERGENCY ELECTRICITY!

750 WATT • 115 VOLT • 60 CYCLE

A.C. LIGHT PLANT

USE FOR: Home lighting, trailers, tourist cabins, hunting lodges, fire truck lighting, emergency standby units. Plenty of power for deep freezer, oil burners, incubator, radio or lights.

GENERATOR: Manufactured by Elecor, rated 750 Watts 115 Volts A.C., 60 cycles at 1800 R.P.M. Complete with volt meter regulator. \$249.00 value. These generators, acting Signal Corps specifications, are the answer to your lighting needs. (ITEM #86)

GASOLINE ENGINE: Briggs & Stratton, Model AP, 2¼ H.P., 1800 R.P.M. Completely radio shielded, full accessories including air cleaner, muffler, starting rope, killer button, remote control wire. Shpg. wt. 165 lbs. Complete unit, \$249.00 value. **139.00** NOW ONLY (F.O.B. Chicago)

GENERATOR ONLY **59.50** Same as described above. Shpg. wt. 60 lbs. (ITEM #67) F.O.B. Chicago

UTILITY ROTARY VANE PUMP

Perfect For Water, Oil or Insecticides

Sprays DDT, 2-4D, sulphur compounds, etc. Pressures to 150 lbs., 15 gals. per min. at 1200 RPM using 2 HP. As vacuum pump for milking machines, lab use, etc., delivers 26" vacuum, 4.5 cu. ft. per min. at 1500 RPM, using ¾ H.P. Rotate either direction, 1½" pipe thread ports, 1½" standard shaft, 4 ball bearings. Easy to mount-Ready to run. Shpg. wt. 13 lbs. F.O.B. Chicago **16.50** (ITEM #51)

LOGAN HEAVY DUTY HYDRAULIC PUMP

For operating hydraulic cylinders and hydraulic motors on tractors, bulldozers, construction machinery, lift trucks, industrial applications, etc. Delivers 10 GPM at 1200 RPM at 1000 P.S.I. using 5 HP. Has ¾" inlet, 1½" outlet, ¾" shaft with flat and keyway for direct or pulley drive. Has flange with 4 bolt holes for convenient mounting. Ship, wt. 22 lbs. Overall dimen.: 7" L x 5½" H x 5½" W. A \$105.00 value FOR **22.50** ONLY (ITEM #29) F.O.B. Chicago



FREE: 44-PAGE CATALOG—Full of unsurpassed War Surplus "buys" including generators, pumps, welders, double action hydraulic cylinders, control valves, tanks, pumps, hose, fittings, and data on hydraulic applications. Write today!

ORDER DIRECT FROM AD — SEND PAYMENT OR PURCHASE ORDER, TODAY — SATISFACTION GUARANTEED

GROBAN SUPPLY CO. 1507 SOUTH MICHIGAN AVE. Chicago 5, Ill. Dept. PS-8



For Loose Caster Guides

Remove the guide, fill the hole with a putty-like mixture of Smooth-On No. 1 Iron Cement and drive the guide back in. It will stay in place, because Smooth-On, in hardening, expands slightly and takes hold tight. Use Smooth-On for tightening other loose parts and also for stopping leaks in boilers, furnaces, piping, radiators, etc. Buy Smooth-On No. 1 in 1 3/4 oz., 7 oz., 1 lb., 20 or 100 lb. size at your hardware store. If they haven't it, write us.

FREE Repair Handbook

Shows how to save time and money, making many household repairs. 40 pages. 170 pictures. Clear directions. Send today.

SMOOTH-ON MFG. CO., Dept. 58H
570 Communipaw Ave., Jersey City 4, N. J.

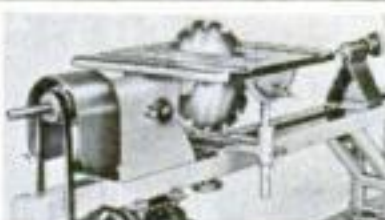
SO-313

Do it with
SMOOTH-ON
THE IRON CEMENT OF 1000 USES



RETAIL PRICE \$125.00
FACTORY TO YOU \$59.95

SUPERSHOP includes precision-built 8" tilting table saw, vertical and horizontal drill press, 30" lathe, sander, grinder. 100% BALL BEARING. Write for FREE catalog, full details, trial plan.



POWER TOOLS, INC.

214 Yates Avenue
Beloit Wisconsin

WAR SURPLUS AND OTHER BARGAINS



PNEUMATIC RIVETER & CHIPPING HAMMER

Mfg. by Ingersoll-Rand. Chicago Pneumatic and Thor. Pistol grip. Ideal for fender, brake lining, concrete breaking work. Like new. Six rivet sets and bucking bar included, making a complete combination. Wgt. 9 lbs. Each \$6.95

INSIDE MICROMETER 2" to 8"

Precision made of tool steel. Hardened tips on all six measuring rods. One 1/2" spacer. Chrome finish. Complete with case. \$6.95



MICROMETERS



Chrome plated, precision engineered and carefully tooled to give long life. All new. 0-1" capacity . . . ea. \$2.25. 1-2" cap. \$3.50. 2-3" cap. \$5.50. 3-4" cap. \$6.50.

HIGH SPEED DRILLS

All New. Fractional & numbered. Orig. Val. \$15. Nationally known brand. Ast. sizes. Set 30. \$3.50

EXTENSION DRILLS

High Speed Steel, like new. Asst'd sizes from No. 1/4 to 40. Lengths from 6" to 12". Approximately \$20 value. Set of 12 . . . \$3.75

Send check, money order or cash. 25% deposit required on C.O.D. orders. All prices F.O.B. Culver City, Calif. Send 25c for Illustrated Catalog.

AIRBORNE SALES CO., INC. DEPT. PSM 8-O
CULVER CITY, CALIF.

Mechanics of Farming

caps are intended to prevent frost injury and help retain moisture.

■ The food industry--farms, factories, stores--is the largest in the country, according to a Twentieth Century Fund report.

■ Most farmers are demanding multi-purpose sprayers, says the Farm Equipment Institute. They want one machine to control insects, kill weeds, spray dairy barn and poultry house walls, and do painting. While such equipment was scarce just after the war, many new machines are being made now. Some of them eliminate several men; others are one-man jobs utilizing the mast principle and high pressures.

■ A new application of the vinylite-plastic coating that protects military equipment against weather and rust makes possible a large cut in the cost of sealing crop-storage structures for fumigation, says the Bakelite Division of Union Carbide and Carbon Corp. The material is applied with a spray gun and dries into a tough film that is resistant to weather, flame, and chemicals.

■ A cotton yarn wholly soluble in water, expected to be of value in the packaging of food products, is announced by the Southern Regional Research Laboratory, New Orleans.

■ Correction: The Scythette portable power mower described here in May (p. 242) is made by Hoffco, Inc., of Richmond, Ind.

■ Wanted: A device that can measure a few millionths of a volt. Hatcherymen need it to be able to tell whether or not an egg is fertile, says Karl Norris, engineer at Dept. of Agriculture's research center, Beltsville, Md. Such a gadget is expected to be available shortly.

■ While this column is devoted to the technical and non-livestock sides of agriculture, it is with nostalgia and some sadness we report the demise of the Horse Association of America. Founded 'to aid and encourage the breeding, raising and use of equine stock,' it has voted to dissolve after some 30 years of existence. Farm mechanics marches on!

Get out of the

Danger Zone

The More You Delay—The More You Pay

There's always danger ahead when piston rings wear out—danger of much greater expense unless new rings are installed promptly.

But if you *do* install new rings at the first symptom of wear, you can protect your engine and insure its long and economical life.

Check your own situation on the Danger Zone chart, with the help of your service man. This simple precaution may save you both money and headaches. For the more you delay the more you pay. And if you need new piston rings, get Hastings, the rings designed for replacement service. It's the best money you can spend on your car.

WARNING ZONE

Engine loses pep . . .



DANGER ZONE 1

Engine begins to smoke . . .



DANGER ZONE 2

Engine pumps oil badly . . .



DANGER ZONE 3

Destructive wear sets in . . .



Needs a tune-up

Clean, adjust and re-time ignition. Clean fuel supply and carburetor screens. Adjust carburetor. Adjust tappets and fan belt. Check compression and vacuum readings for symptoms of ring wear.

Needs new piston rings and minor engine repairs

Replace piston rings. Align rods. Adjust rods or replace rod bearings. Reseat and reface valves.

Tune engine.

These repairs are comparatively inexpensive and put the engine back in peak condition for thousands of economical miles. Delay puts the engine in Danger Zone 2.

Needs new piston rings and major engine repairs

Replace piston rings. Replace piston pins. Adjust—probably replace—main bearings. Align rods. Adjust rods or replace rod bearings. Reseat and reface valves. Tune engine.

These repairs naturally cost more than those needed in Danger Zone 1, but they put the engine back in condition for thousands of additional miles of satisfactory service. Delay leads to costly Danger Zone 3.

Needs new piston rings and complete overhaul

Repairs cost three or four times as much as in Danger Zone 1.

Remove engine. Rebore cylinders. Replace pistons, pins, rings. Replace main bearings. Align rods, refit or replace rods, or replace rod bearings. Overhaul valve lifters, rocker arms. Replace timing chains or gears. Reseat, reface valves. Replace guides and springs. Replace camshaft bearings. Clean oil lines. Overhaul oil pump.

Clean, re-install and tune engine.

TOUGH BUT OH SO GENTLE



HASTINGS

MANUFACTURING COMPANY
HASTINGS, MICHIGAN
HASTINGS LTD., TORONTO

STEEL-VENT PISTON RINGS



TOUGH on Oil-Pumping • GENTLE on Cylinder Walls

Copyrighted material

FREE ALLIED'S RADIO & TV CATALOG SUPPLEMENT

LATEST RADIO & TV RELEASES HUNDREDS OF GREAT VALUES

Send for ALLIED's latest Supplement! Packed with new TV releases, home radios, recorders, High-Fidelity Music and P. A. Systems, test instruments, new electronic developments—plus hundreds of big values. Get the latest—get more for your money—get your FREE ALLIED Supplement now Write for it today!



HELPFUL RADIO BOOKS!

Dictionary of Electronic Terms. All-new reference guide has definitions of over 2500 terms used in television, radio, electronics and nucleonics. Invaluable for engineers, students, experimenters. Has useful data appendix. Published and made available by ALLIED at minimum cost.
No. 37-756. Only **25c**

Radio Formulas & Data.....No. 37-752...10c
Simplified Radio Servicing.....No. 37-755...10c
Radio Builders' Handbook.....No. 37-750...15c
Radio Circuit Handbook.....No. 37-753...25c
Radio Data Handbook.....No. 37-754...25c

All 6 Books
No. 37-799

Only **\$1.00**

FREE
CATALOG

Order from **ALLIED RADIO**
833 W. Jackson Blvd. • Dept. 7-H-O • Chicago 7

ALLIED RADIO

See your ALLIED Catalog for Everything in Radio & TV

WHIZZER 3 H. P. MOTOR

America's finest bike motor

Make your bike a lively, powerful motor bike with big, new Whizzer 3 h. p. bike motor. 4-cycle, 138 c.c. 5 to 40 m. p. h. Up to 100 miles per gallon. See your Whizzer dealer or write **WHIZZER MOTOR CO.**, 322 S. Sanford St., Pontiac, Mich.

\$89.95

Plus tax



FOB
Pontiac

BELT SANDER EASY SPEEDY



Save time and effort... use American Portable Sanderplane! Handles more work and is many times faster than a hand plane—well balanced, powerful, efficient. Write for details.

AMERICAN

FLOOR SURFACING MACHINE COMPANY
532 So. St. Clair St. Toledo 3, Ohio

1/3
USUAL
PRICE



7x50 BINOCULARS

With COATED LENSES and PRISMS
Precision Optics **\$30***
BRAND NEW

Highest optical performance. Over twice the light transmitting power of any 8x40, 10x50, 7x35 or 6x30, three times that of any 8x30, and eight times that of any 6x15 binocular. Fully corrected, needle sharp achromatic optics with wide angle of view. Lifetime aluminum alloy construction, leather covered.

7x50—\$30
Illustrated
Ht. 7 in.
Wt. 36 oz.

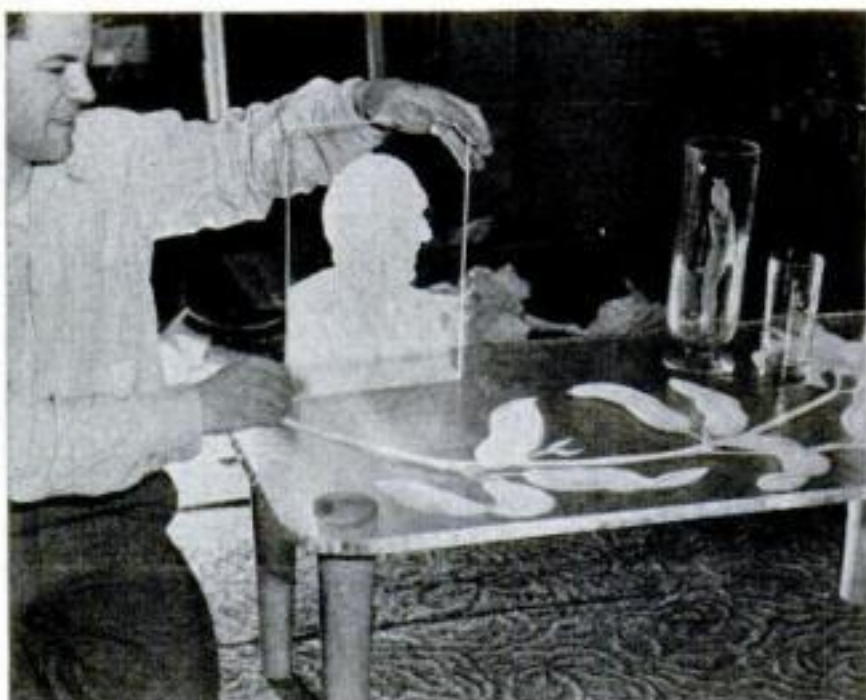
OUTPERFORMS BINOCULARS COSTING OVER \$100

DeLuxe Leather Case and Straps \$4.50*

*20% Fed. Tax — Money Back Guarantee — We Pay Postage

BROWNSCOPE CO. Dept. 8P, 24 W. 45th St.
NEW YORK 19, N. Y.

Sandblasting Creates Sculpture in Glass



Willis G. Lowry with four glass items, including the portrait he is holding, all decorated by the sandblasting process. The table top, of rough plate, will sustain 600 pounds.

WHILE watching a sandblasting machine at work, artist and glass-designer Willis G. Lowry got an idea. If the force of the blast could be controlled, he would have an excellent tool for working with glass. He experimented with several models until he finally designed a machine that suited his purposes. Now, in his Silver Spring, Md., workshop, he is able to carve varying depths into glass, achieving three-dimensional bas-relief effects. His biggest job was making 47 glass murals for a county court house in Pennsylvania. Averaging three by five feet in size, they took him nine months to complete.



Carving is done by blowing a mixture of fine sand and air through a tiny nozzle. Special tape covers glass not to be decorated. Depth is varied by increasing or decreasing pressure.



SAVE TIME, WORK, MONEY!

SHAW
"DU-ALL"

and "PEPPY PAL" TRACTORS

PLOW



CULTIVATE



SHAW
MFG. CO.

These rugged walking or riding tractors are ideal for farm, truck garden, orchard, poultry farm. Operate on a few cents an hour. A child can handle them.

DO DOZENS OF JOBS Both riding and walking tractors quickly and easily plow, cultivate, harrow, disk, bulldoze, spray, haul, grind, saw wood, etc.

LOW FACTORY PRICES Buy direct or through your dealer. Year's guarantee!

RIDING TRACTORS 4 models from 5 to 12½ H.P., 58 in. wheelbase, 36 to 52 in. wide, 24 in. plant clearance. Hand or electric starter. Walking Tractors 1½ to 5 H.P.

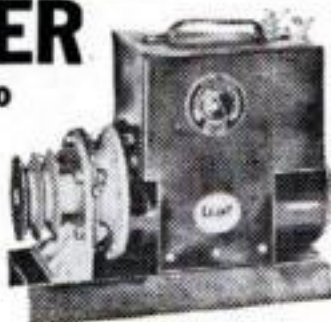
FREE Illustrated folders giving complete details and price lists—write today!

5708 FRONT ST., GALESBURG, KANS.
668 PSNORTH 4TH ST., COLUMBUS, O.

D.C. ARC WELDER

\$300 VALUE—ONLY \$97.50

200 Amperes Continuous Duty. Up to 250 amps. intermittent duty. Easily mounted on your tractor. Welding range from 0-up by dial type control. 1-yr. guarantee with money back 10-day trial period. Write for FREE literature. OR send 35c for PLAN "Build Your Welder from Aircraft Generator" literature included.



LEJAY MFG., 823 LEJAY Bldg., Minneapolis 8, Minn.

WRITE
FOR
FREE
Building
Instructions
The Rite-Way
Mower
Attachment



BUILD YOUR OWN POWER LAWN MOWER

WHY PAY MORE FOR
FACTORY BUILT MOWERS?

Now anyone can save time and effort mowing field or lawn by building their own whirl type Power Mower. Build it in a short time with parts and instructions we furnish. Requires no special tools.

Write Today for Free Building Instructions

T & H MFG. CO., INC.
Dept. MSB-8, 811 E. 31st St.
Kansas City, Mo.



Ask Your Hardware Store for FULLER'S Unbreakable Amber Handle SCREW DRIVERS

America's most popular line of moderately-priced screw drivers! Wide range of sizes. FULLER TOOL CO., Inc., 911 Faile St., New York 59
World's largest maker of Amber-Handle Tools

WAR BARGAINS
Over 200 terrific
SURPLUS ALSO FACTORY
VALUES!
SEND FOR FREE
Catalog
SIOUX FALLS
SURPLUS STORE
SIOUX FALLS, S.DAK.



BARGAIN! BRAND NEW! SPINNER!

only \$42⁵⁰ Save \$40! REG. \$82.50
7-in. disc

Direct From Manufacturer—

Uses 7-in. or 9-in. disc—Sands, grinds, wire brushes, etc. Makes tough jobs easy. ¾ h.p., Heavy Duty Motor. 10-day, money-back guarantee. No C.O.D. Send check or M.O. TODAY—while they last! Californians add 3% State Sales Tax

HOLT MFG. CO. 651 20th Street 272 Badger Avenue
Oakland 12, Calif. Newark 8, New Jersey

NO CAR SHOULD BE WITHOUT ONE!



CASCO VIS-O-LITE

Illuminated Automatic

CIGARETTE LIGHTER

Why be without the convenience of this great new Vis-O-Lite illuminated lighter that makes driving safer day and night? You can replace your old lighter with a new Vis-O-Lite in a matter of minutes with pliers and screwdriver . . . and get the advantages of an illuminated lighter—well that ends fumbling in the dark, prevents scratching dashboards. Made by the manufacturers of the original pop-out lighter that's standard equipment on 4 out of 5 cars. Costs only \$2.75 complete. The illuminated well-assembly alone (minus the pop-out unit) costs only \$1.25. Now on sale at Car Dealers, Auto Supply Stores and Service Stations.

NO HOBBYIST SHOULD BE WITHOUT ONE!

CASCO ELECTR-O-TOOL

Does More
Costs Less!



25
piece set

\$14⁹⁵

The most complete, practical power-workshop any craftsman or hobbyist can own. Absolutely an essential for Model Train Builders! Has ALL the accessories you need to drill, cut, etch, carve, grind, buff, sand, engrave, saw and sharpen—metal, wood, glass, leather, plastic and fibre. 1001 year-round money-saving uses. Operates on AC and DC current. Fully GUARANTEED.

Now on sale at Department, Hardware, Appliance, Auto Accessory and Jewelry Stores.

CASCO PRODUCTS CORPORATION
BRIDGEPORT 2, CONNECTICUT

CASCO

The JIFFY metal CABINET

YOUR ANSWER TO SMALL ITEMS STORAGE

at home, office, and shop
(IDEAL GIFT, TOO)

So handy to keep nuts,
bolts, screws, nails,
parts, washers, stamps,
hobbyists' needs, etc.,
at your fingertips.



THIS 32 DRAWER UNIT ONLY \$8.95 POSTPAID

Stop searching, get a 32 or 64 drawer Jiffy to keep those small items that usually get mislaid. Spot welded steel, gray enamel finish, metal drawer guides. Dividers included with aluminum drawers make possible three compartments per drawer. Looks good anywhere. Send check or money order, please—no C. O. D.'s. Prices below. Your money refunded if not satisfied. Dealers write for quantity discount.

SPECIFICATIONS

32 Drawer Unit

6" Deep
12 3/4" Wide
15 1/4" High

64 Drawer Unit

6" Deep
25 1/2" Wide
15 1/4" High

Drawer Size

1 1/4" Deep
2 3/4" Wide
4" Long

WITH ALUMINUM DRAWERS

Dividers and Index Cards Included

One piece rustproof aluminum drawers for heavy service—good for work bench and industry use.

32 drawer - \$8.95

64 drawer - \$15.95

Ohio orders add 3% sales tax.
Marproof Rubber Feet included with all cabinets
POSTAGE PAID | POSTAGE PAID

NEW SPECIAL! ONLY \$2.95

8 DRAWER UNIT
(24 compartments)

16 DRAWER UNIT
(48 compartments)

\$4.95

Specifications

6" Deep, 8 1/4" High
8 Drawer 6 1/4" Wide
16 Drawer 12 1/4" Wide

KAYTEE PRODUCTS, Dept. S, Box 588, Canton, O.



Enough plans, projects, and ideas for
A WHOLE YEAR OF WOODWORKING FUN!

— in the popular hobbyist's magazine
THE DELTAGRAM®

Send in your subscription!
Mail check or money order.

POWER TOOL DIVISION
ROCKWELL MANUFACTURING CO.
804H E. Vienna Ave., Milwaukee 1, Wis.

KINKADE GARDEN TRACTOR

and Power Lawnmower

A Practical Power Plow and Cultivator
for Suburbanites, Gardeners, Florists,
Estates, Fruit, Nursery & Poultrymen.

Easy Terms - Write Today

American Farm Machine Co.
1072 33rd Ave. S. E. Minneapolis, Minn.



Catalog
Free

NEW! ILLUSTRATED AUTOMOBILE ECONOMY MANUAL

Sent to you

FREE!

Tells You How To
SAVE BRAKES!
SAVE GAS!
SAVE OIL!

& reduce upkeep
on your car

Tells you how to get
more POWER, SPEED,
MILEAGE, PICK-UP &
BETTER PERFORM-
ANCE from your car.

Written so you can
understand it and follow its simple
instructions. Also tells how to get new
automotive products that are designed and
engineered to CUT automobile driving costs,
including mileage meters, radial cathode
spark plugs, rocket boosters, water-alco-
hol injectors, exhaust superdischargers etc.
Priced at 50c, but sent absolutely FREE
when you answer this advertisement.
Supply is limited, so order now. Send
name, address to:

NATIONAL AUTOMOTIVE RESEARCH
CORPORATION, Dept. H-8B
350 W. Washington Blvd., Venice, Calif.

Economy

in
Driving

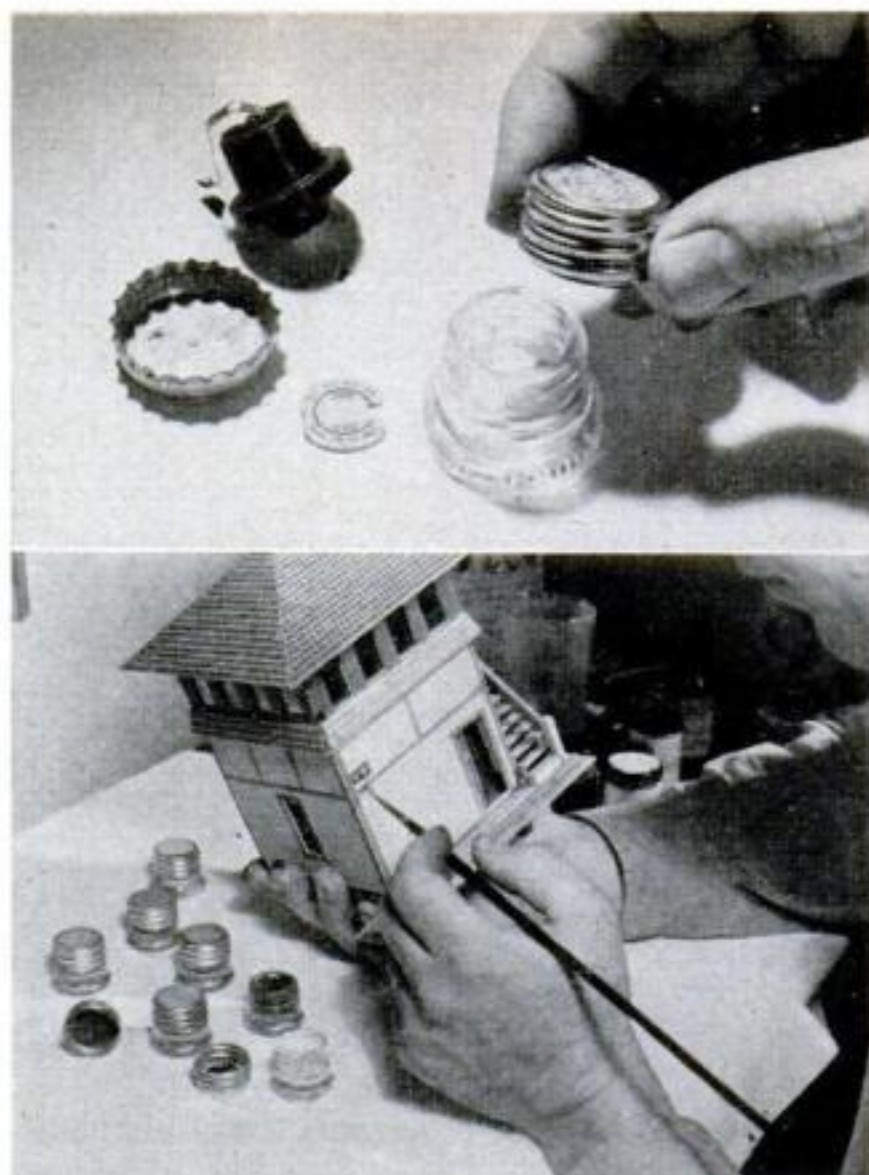
ALSO

INTRODUCES

25 NEW

ECONOMY

PRODUCTS



Paint Pots for Modelmakers

BURNED-OUT fuses offer ready-made paint pots for modelmakers, textile and figurine painters, and others who want to mix small quantities of special colors.

Cut or melt open the dab of solder that holds on the shell, and unscrew this from the glass body. Discard the core, and you have a tiny glass cup. The cork or foil lining from a bottle cap will just fit inside the screw shell to make a cap of it. You can also cut liners from rubber or waxed cardboard.

By screwing on the lined shell snugly, you can keep tiny quantities of paint in the glass fuse cup indefinitely. Dab some color on top of the liner to indentify the contents. A handy palette can be made by boring holes to fit the fuse cups in a piece of thin plywood or plastic.—Carlton G. Bucher, White Plains, N. Y.

Full Gas Tank Stops Rust

WHILE you are traveling, it's a good idea to fill your gasoline tank each evening instead of waiting until morning. Then overnight temperature changes will not cause water to condense on the inside tank walls—something that, over a period of time, both contaminates the fuel system and rusts the tank.

Only \$3.49 **NOW! For Your Car!**
LUMINATOR ALL-PURPOSE
SPOTLIGHT
PLUGS INTO CIGARETTE LIGHTER
90,000 BEAM CANDLE
POWER!
USE
INSIDE OR OUTSIDE CAR



THE IDEAL LIGHT FOR

... locating House Numbers, reading Street Signs, Road Markers, Fog—to follow Curb, Emergency Warning, Trouble Light, tire repair—motor repair, Back up Light, Map Reading Light, Beach Parties, Picnics, Boats—for Landing, Mooring, Navigating.

LIGHT WHEN and WHERE YOU WANT IT!

A powerful, bright-as-day beam of light right in your hand! Just plug LUMINATOR Portable Spotlight into cigarette lighter socket in your car—and presto!—brilliant portable light for any and every need! Compact... fits in glove compartment. Has genuine G. E. 6 to 8 volt Sealed Beam unit—100 hour life, same as headlights. Handsome polished aluminum. Bakelite handle. Order yours today.

SEND NO MONEY! Mail order. Pay \$3.49, plus few cents postage and C. O. D. on delivery. Or send \$3.49 and we pay postage. Money back in 15 days if not delighted. Act now. **LUMINATOR, Inc., 120 N. Peoria St., Dept. H-11 CHICAGO 80, ILLINOIS**



For Fast Economical Winter Travel BUILD A SNOWCAR

Complete working drawings \$2.50. Can furnish any part or complete factory built machines. For information, write: **CALLAIR CO., AFTON, WYOMING**



The HOME CHEMIST

A new book which shows how to set up and operate an inexpensive home laboratory with odds and ends of material available in every home. Many thrilling, practical, useful experiments and tests, entertaining, instructive, valuable, pointing the way to research and new discoveries. Many diagrams and illustrations. Full cloth bound \$1.49.

POPULAR SCIENCE MONTHLY, Dept. 850 353 Fourth Ave. New York, N. Y.

FOAM RUBBER

FOR HOBBYISTS, CRAFTSMEN, EXPERIMENTERS

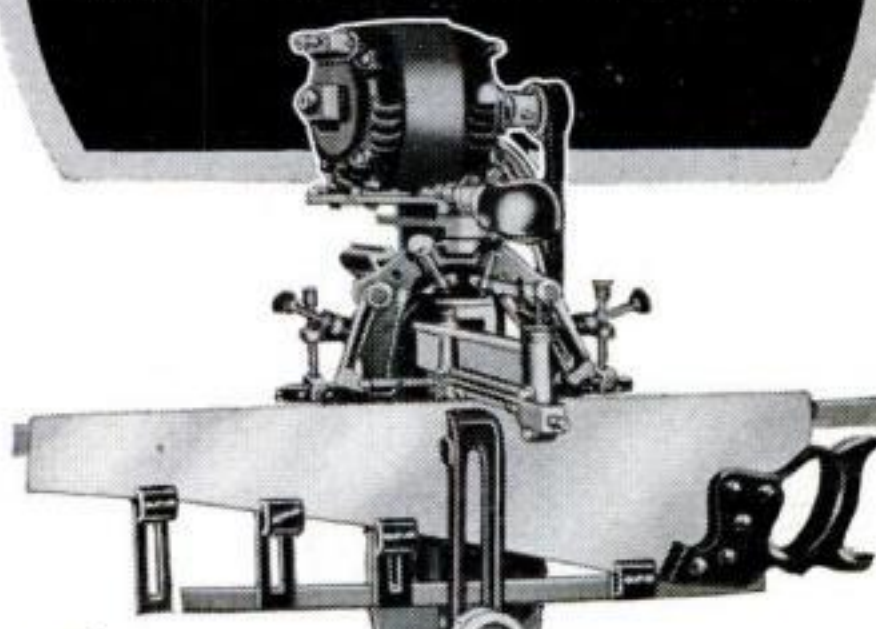


Lowest Prices—SAVE 50 %		AUTO SEAT TOPPER PADS	
16 x 16 x 1 1/2"...	ea. \$1.25	Place on seat cushion and cover with your seat cover.	
16 x 22 x 1 1/2"...	ea. 1.55	24" x 60" x 1 1/2"...	ea. \$5.00
18 x 24 x 2"...	ea. 2.00	24" x 60" x 2"...	ea. 7.50
24 x 24 x 2"...	ea. 2.75		

Use for furniture cushion fillers, mattresses, Mattress pads, cushions. Foam Rubber is available in any size or thickness. Send For Free Price List. Immediate delivery. No C.O.D.'s. Add 10% for Postage & Handling to Above Prices.

RIOR RUBBER COMPANY, Dept. S-9 50 East 22nd St. Chicago 16, Ill.

Made \$900 IN SPARE TIME



with FOLEY* automatic SAW FILER

*Trade Mark Reg. U. S. Pat. Off.

"I did very well last year with my Foley equipment, about 950 saws and 240 lawn mowers, in my spare time. About \$900 for me."—Leo H. Mix. "I have done 4 or 5 thousand saws in my spare time in the 4 1/2 years since I got the outfit, and they are all coming back."—says Len Crego.

Make up to \$2 or \$3 an hour in Spare Time. With the high prices of food, clothing and everything else, just think what you could do with extra money every week! With a Foley Automatic Saw Filer you can file hand, band and circular saws better than the most expert hand filer. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. Every saw you sharpen with the machine accuracy of the Foley Saw Filer is an ad that brings you more customers. Cash business, no canvassing. No eyestrain, no experience needed.

FREE BOOK

"INDEPENDENCE AFTER 40!"

Shows just how you can start at home in spare time in your basement or garage. Just think—with a small investment, no overhead, no stock of goods to carry, you can get right into a cash business—and later on develop into a full-time repair shop. Send coupon today for this practical plan. No salesman will call.



Send Coupon for FREE BOOK

FOLEY MFG. CO., 819-O Foley Bldg., Minneapolis 18, Minn.
 Send FREE BOOK—"Independence After 40".

Name.....

Address.....

**10-Day
FREE
TRIAL**

**Cash or
Easy Time
Pay Plan**

EMRICK
All
PURPOSE
SPECIAL

\$70 price includes every item shown here except the bench lumber.

**DOES SAME WORK
AS \$200 WORTH
OF SINGLE UNITS**

EMRICK 5-in-1 MACHINE Complete
with 1/3 H.P. Motor, Drive Pulley, V-belt,
7" Saw Blade, 5 Wood Drills, 6 Best Quality
Lathe Turning Tools, 2 Steel Bench Legs, Buff-
ing Wheel, 6 Abra-
sive Discs and Distic

5
Complete
**POWER
TOOLS**
for
**TURNING
DRILLING
SAWING
SANDING
GRINDING**

115 pounds of REAL machinery. Biggest Bargain in power tool history! \$11.39 below our factory-to-you price. You can do practically any type of wood-working — *handle big jobs* — make home repairs — operate money-making business. Emrick *saves you both jobber and dealer profits.* Order NOW — or write for FREE literature. **EMRICK, Inc.** 1544 Clinton, Kalamazoo, Mich.

SHARPEN CIRCULAR SAWS
LIKE AN EXPERT



The Super Gadget for Home Workshop
Two simple adjustments. Gets hollow-ground, cross-cut or combination saw blades true and sharp. Fits 6" to 12" blades $\frac{1}{2}$ " to $\frac{13}{16}$ " centers. Includes file, complete instructions. \$6.95 postpaid. (C.O.D. postage extra.) Guaranteed—Money back if not satisfied after 10 day trial. **Soon pays for itself.** Order today. Free folder.

SURE SHARP MFG. CO., Dept. S-80
P. O. Box 24 Santa Ana, Calif.

Another of thousands of uses for
WISE-GRIP WRENCH

LOCKS to work with more than Ton-Grip! Does jobs no other tool can do. **In-volute Jaw Curve** holds all shapes. **Knurled Jaw Tips** hold to the very tip. Has **Thin Nose, Super Wire-Cutter**. With cutter- No. 7-W, 7", \$2.25, No. 10W, 10", \$2.50; Without cutter-No. 7C, 7", \$1.85, No. 10C, 10", \$2.25. *If not at your dealers, order direct.*

PETERSEN MFG. CO., Dept. M-8 D



LOCKS With Ton-Grip

DeWitt, Nebr.



Our 294th Advertisement

REAL DIESEL ENGINE!

\$295
You can't beat this price!

- Ideal for planes, boats, midget cars
- Actually runs at 7500 RPM, produces 1/7 HP
- Precision machined for smooth operation
- Comes to you completely assembled, ready for operation.

MAYBE WE'RE CRAZY, giving away a precision diesel engine, complete with cylinder and piston, carburetor, crank-etc., for **ONLY \$2.95**. But we're selling all over the world, and that keeps our n. DEEZIL is streamlined, compact, easy to install, runs for years! Fast **DEEZIL TODAY!**

Send \$2.95 plus 25c postage

★ GOTHAM HOBBY CORP., Dept. S, 107 E. 126th St., New York 35, N. Y.



Camp Cot Made of Aluminum

THIS sturdy, aluminum-frame camp cot will support 675 pounds, yet weighs only eight pounds itself, a third the weight of conventional wood-frame cots. Made of hinged, tubular members, it folds quickly into a small, compact bundle that can easily be carried on a back pack or in a car. The Duralite Co., of Brooklyn, N. Y., makes the cot with a blue or olive-drab canvas cover.



Sleeping Mat Chases Fleas

THE tired but happy pooch above is resting comfortably on a new sleeping mat that will appeal to all animals harboring troublesome insects. Covered with a heavy cotton mesh and permanently impregnated with an insect repellant, the mat is said to clear an animal of fleas, nits, or ticks overnight. Made by the V. F. Garrett Co., of Dallas, Texas, Flea-No-Mat also tends to neutralize objectionable animal odors.



*Hi-level needs water
only 3 times a year!*
In Normal Car Use

prest-o-lite hi-level

70% longer average life*!

AVOID battery failures, get longer battery life, with the new Prest-O-Lite Hi-Level Battery that needs water only 3 times a year in normal car use. Helps prevent a major cause of battery failure. In addition, Hi-Level gives you Fibreglass mats to keep power-producing material in the plates for longer life. Make your next battery a Prest-O-Lite Hi-Level.

PREST-O-LITE BATTERY COMPANY, INC.
Toledo 1 Ohio



*In tests conducted according to S.A.E. Life Cycle Standards.

AIR CONDITION Any CAR

PLANS SHOW YOU HOW... \$1.00 • HOT OUTSIDE... COLD INSIDE

Enjoy pleasure driving in cool comfort in scorching outside temperatures, with real mechanical refrigeration. (Not a dry ice or window unit.) Easily installed by anyone handy with tools. No experience necessary. Powered direct from your engine. Completely automatic. **PATENT FEATURE** controls temperature from idle to 100 mph. Build and install it yourself! Keeps your automobile comfortable. Tractor Cab cool. Truck cooled for hauling perishables. Send \$1 for your **PLANS** now. Do it today.

LEJAY MFG. CO., 523 LEJAY BLDG., MINNEAPOLIS 8, MINN.



ARC WELDING PAYS \$300. to \$500. MONTHLY

A.C. shop welder

Knock out first class welding jobs in a hurry with this full capacity unit. Take on big jobs or small. New transformer reactor type with 500 different current settings. Silent. Easy to use. Costs very little to operate.

LOW MONTHLY PAYMENTS to help you get started now, "pay out of extra profits." Ask for details.

A.C. field welder

Cash in on big profits. Go to the profitable outside jobs with this new gas engine driven, two-in-one unit. Make arc welded repairs or flip a switch and operate A-C lights, tools, motors. Meet emergencies caused by power failure.

FREE CATALOG will be sent on request with no obligation whatsoever.



HOBART BROTHERS COMPANY,

BOX P-801, TROY, OHIO.

**Also D-C Welders.
— WRITE TODAY.**



LOOK at these Surplus Bargains from ATLAS!

GAS CAN

Used, 5 gallon, with flexible spout.

\$2.45



Extra Spouts, each **39c**



Famous New "Wasp" ELECTRIC MOTOR

Aircooled. Fractional hp AC 110 V. motor with reversible switch. Ideal for Hobbyists. Regularly sold for \$8.95. Special, each **\$4.95**



MICROMETERS —PRECISION

Made by nationally known manufacturers to give a lifetime of accurate detailed service.

1" Central Tubular, also ideal for tubing... **\$3.75**
1" Reed... **\$5.25**
2" Central... **\$5.95**
3" Central... **\$7.00**
6" Central... **\$7.75**
Inside Mic. 0-1" McGrath **\$4.95**
Also Millimeter Mikes



NEW DESK LAMP

Regular \$12.50 value, adjustable. A real buy, **\$5.95** only

PORTABLE COMPRESSOR

1½ hp gasoline-driven, air-cooled Bendix-Westinghouse; 2 air hoses included. Displacement, 4 cubic feet per minute. Wheelbarrow type. Rebuilt, guaranteed.....

\$99.50



-All Prices FOB, K.C. No COD's. Send chk. or M.O. for immediate shipment.

ATLAS EQUIPMENT CO.

**229 S.W. Blvd. Dept. P.S. 8
KANSAS CITY, MO.**

SECRET POWER

with the **NEW**



HYDRO-POWER injector

for Patent Pending
AUTOMOBILES • TRUCKS • TRACTORS

WHAT HYDRO-POWER INJECTOR DOES

LOWERS FUEL COST

Injecting water vapors increases the fuel rating.

INCREASES PERFORMANCE

Engine operates more efficiently and with increased acceleration.

REDUCED CARBON DEPOSITS

Frees the engine of dangerous combustion chamber deposits.

LONGER ENGINE LIFE

Elimination of carbon, lowers sludge in crankcase, and extends life of spark plugs and piston rings.

On ordering specify make of car and horsepower of engine. All engines over 120 h.p. take large \$15 size. Automobiles, \$12.50 list Truck, Tractor, \$15.00 list

DISTRIBUTORS AND SALESMEN WANTED—WRITE IMMEDIATELY TO

HYDRO POWER SALES, INC.

401 Bank Block Bldg.

Denver 2, Colorado



Know all the answers, INSTANTLY, with an A-C-I WINDOMETER

complete as
89.50
illustrated

FOR AIRPORTS,
BOATS, HOMES,
INDUSTRY, FARMS!

Know the important facts about outside weather instantly—and have them right at your fingertips, in one compact unit!

WIND VELOCITY—calibrated in leading University Lab. Wind Tunnel, for extreme accuracy.

WIND DIRECTION—built to aviation standards.

OUTSIDE TEMPERATURE—precision made, aircraft quality. All instruments and transmitters are highest quality precision aircraft type, with Gold-palladium and Silver contacts. Completely self-contained unit—use anywhere—easily installed.

NEVER BEFORE such quality and precision at this amazing price!

AIRCRAFT COMPONENTS, INC.

1201 Woodland Avenue

Benton Harbor, Mich.

Please send me one WIND-OMETER complete as illustrated. My Check/Money Order for \$89.50 enclosed. Name _____ Street _____ City _____ State _____



BOOKS!

BOOKS!

BOOKS!

Unbelievable BARGAINS!
SAVE UP TO 92%

Warehouse clearance sale—all brand-new books that sold originally for as high as \$11.95—now only 99c each! Only limited quantities available for each title. Send no money now unless you prefer to—clip Order Coupon below and mail TODAY! If not delighted, return books within 7 days for FULL REFUND!

#89. HOW TO MAKE MONEY—Small Store and Independence. Every phase of successful business operation. Was \$4.00. NOW 99c

#133. FUNDAMENTALS OF SHOPWORK. Hand, power tools; blueprint reading, etc. Was \$1.75. NOW 99c

#151. FUNDAMENTALS OF FARMING. 470 pgs. crammed with latest methods of earning money on your own farm. Basic guide; covers everything! Illus. Was \$2.50. NOW 99c

#152. CHILDREN'S PKGE. BRAVE BANTAM. Delightful animal story. Illus. BEAR THAT WASN'T. Hilarious humor for young and old! Wonderful pictures! Were \$2.25. Both, NOW 99c

#153. FICTION PACKAGE. PRIVATE LIFE OF HENRY PERKINS. Rollicking tale of a London dreamer. MEN AGAINST THE ICE. Adventure in the Arctic. Were \$3.50. Both, NOW 99c

#210. FUNDAMENTALS OF ELECTRICITY. Covers all aspects of electricity! Illus. Was \$2.00. NOW 99c

#225. AVIATION MECHANICS SIMPLIFIED. 576 big pages; 795 illus. Formerly a 4-volume set at \$11.95. 1 giant volume. NOW 99c

#246. MATHEMATICS. Covers practical math; log. tables. Was \$2.50. NOW 99c

#278. NEW STANDARD POCKET DICTIONARY. Handy-size; 50,000 words; 1,008 pgs. Illus. NOW 99c

#283. BOATS ANYONE CAN BUILD. Easy plans for building craft from canoes to cruisers! Illus. DeLuxe edition. Was \$3.50. NOW 99c

#307. HOW TO TAKE CARE OF YOUR HOME. Covers all home repairs. Illus. Was \$3.00. NOW 99c

#309. BUILDING OR BUYING A HOUSE. Money-saving tips on everything from selecting site to financing. Was \$2.75. NOW 99c



MAIL TODAY!

FOREMOST BOOKS, Dept. 850, 353 4th Ave., N. Y. 10
Please send C.O.D. books circled below. On delivery, I will pay postman 99c each plus shipping charges. Books may be returned within 7 days for full refund.

#89 #133 #151 #152 #153 #210
#225 #246 #278 #283 #307 #309

NAME.....

ADDRESS.....

CITY & ZONE.....STATE.....

☐ Check here if you remit with coupon, and we will pay postage. Same return privileges.

Build your own SMITH Compressor

Operates spray guns, rock drills, tampers, paving breakers, sandblasting . . . Uses only 1 gallon of gas an hour!



Save Money—build your own Smith Air Compressor! Famous the world over! Capacity 60 cu. ft.; pressure up to 100 lbs. per sq. inch. Just order the Smith Compressor Head and Accessories with complete instructions for assembling. All you need is a Ford Motor and shop facilities. Head equipped with high speed compressor valves; automatic unloading and idling.

Write for complete information!

GORDON SMITH & COMPANY, Inc.
405 College Street • Bowling Green, Ky.

POWER MOWERS

Powerful—Streamlined

Complete with Maytag, Power Products or Briggs-Stratton Engine—18" rotary tool-steel, fully guarded blades—cast aluminum body. Cuts grass and weeds, wet or dry—does all trimming—chops grass into fine mulch, eliminating raking. Send check with order, or specify C.O.D. Write for free information.



SALES REPRESENTATIVES WANTED

HARTMAN Corp.

1111 So. Kirkwood Rd., St. Louis 22, Mo.

PLYWOOD BOAT KITS

\$87.50
(Freight Included)



Build this 12-ft. sport run-about from ready-cut parts. Kits include all hardware, paint, etc., to complete the boat shown. Send for free folders of all models as low as \$29.95 freight included.

TAFT MARINE WOODCRAFT

Dept. S, 636 39th Ave., N. E., Minneapolis 21, Minn.

War Surplus

Below are just a few of the many items we have in stock at sensationally low prices:

Pumps **Air Tanks** **Fire Pumps** **Gas Engines**
Grinders **Drop Cords** **Saws** **Clutches**
Air Compressors **Generators** **Winches** **Motors**

LIGHT PLANTS

SKW Plant 120 volts, 60 cycle AC, was formerly \$1600.00 NEW.

Now only **\$495.00**

Briggs & Stratton gas engine completely rebuilt and guaranteed 5-7 HP \$79.50.
NEW **\$99.00**

Write today for free catalog. Thousands of \$8 saving buys.

C & H ELECTRIC Co.
438 W. JUNEAU AVE.
MILWAUKEE 3, WISCONSIN

Slightly used but reconditioned and fully guaranteed. 2500 Watt, AC, 110 volts, 60 cycle. **\$199.95**

ONLY **\$199.95**

Same unit NEW **\$295.00**

300 Watt Reg. \$135 Now **\$89.50**

1,500 Watt Reg. \$535 Now **\$220**

2,500 Watt Reg. \$700 Now **\$295**

5,000 Watt Reg. \$1,665 Now **\$475**

Comes with 150' No. 6/2 cable; 150' No. 18/2 cable, valued at \$306

7,500 Watt Reg. \$1,705 Now **\$575**

10,000 Watt Reg. \$1,795 Now **\$800**

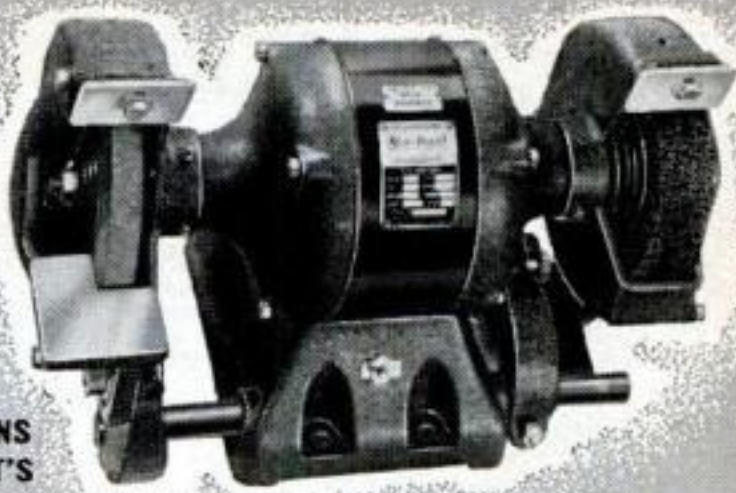
25,000 Watt Reg. \$2,695 Now **\$2,100**

35,000 Watt **\$2,750**

All units 10,000 watts and over, 1 or 3 phase 110-220 volts.

8

REASONS WHY IT'S YOUR BEST BUY



Snap-on* BENCH GRINDER

- Completely enclosed motor.
- Oversize ball bearings throughout.
- Large wheel guards.
- Rugged base. Rubber feet provide solid mounting free from vibration.
- Induction run motor
- develops less heat in winding.
- Adjustable tool rests.
- Capacitor start motor — uses low starting current.
- Many special models are available for use with different voltages and currents.

MAIL TODAY!

* SNAP-ON is the Trade-mark of SNAP-ON TOOLS CORP.

SNAP-ON TOOLS CORPORATION

8060-H 28th Ave., Kenosha, Wis.

Send me 104-page Snap-on Tools Catalog.

Name

Address

City State

Now only **\$9.95**

The **WATCH** that runs like a Submarine



Wear it while swimming or in the shower...you can't hurt this fine 7-jewel watch. It's 100% waterproof!

- UNBREAKABLE CRYSTAL
- LUMINOUS DIAL
- SWEEP SECOND HAND
- REGULAR \$19 VALUE
- SHOCKPROOF STAINLESS STEEL CASE
- 1-YEAR FACTORY GUARANTEE

Here's the finest watch value in years! Wear it anywhere...with pride and complete safety from shock or moisture. \$19 value for only \$9.95. Add 10% Federal tax. Send \$11.00.

SPECIAL: 17-jewel submarine watch, Incabloc jewels, with the same features. Worth \$29.95 — now only \$18.50, plus tax. Send \$20.00.



Protect Your Eyes



Genuine 6 Base Air Force Type

SUN GLASSES

Made from same frames and lenses as glasses selling for \$12.50.

Now only **\$1.95**

Send \$2.00

7x50 size BINOCULARS

\$35.00



Add 20% Fed. tax.

Send \$42.00

Small size as used by the U.S. Navy. Originally cost \$150... our sensational low price includes leather strap and case.

Same as above with coated Lenses \$45 plus Fed. tax. Send \$54.00

MONEY-BACK GUARANTEE

STOP WATCH Chronograph!

It's a STOP WATCH! a TELEMETER! a WRIST WATCH! a TACHOMETER!



It's the most versatile watch made! Originally sold for \$29. One-year factory guarantee. Our price is lowest in U.S.A.

Add 10% Fed. Tax plus mailing costs

Send \$6.55 **\$5.95**

DIX SURPLUS

1104 W. BURNSIDE
PORTLAND 9, ORE.

**EVERY ELECTRIC DRILL
A PORTABLE SAW**

9.95
compt. with 4" "HYCARBON" Blade

AT BETTER HARDWARE STORES EVERYWHERE

Pat. Pend.

'ARCO SAW'

CAN BE USED WITH ONE HAND
Any 1/4" or 3/8" Drill A Powerful Saw in ONE MINUTE

"ARCO-SAW" is a rugged tool with right angle gear drive (no clumsy, dangerous, direct drive with drill sideways). Works like a high priced Portable Saw.

Cuts 1-5/16", or 2 x 4 by turning over

Only ARCO Gives You All These Features: Safety-yoke assures rigid connection and absolute safety—Big handle affords firm grip for two-hand operation—Precision one-piece gear box—Self-lubricating lifetime bearings—Wide shoe-plate for straight, square cuts—Lowest priced, quality Replacement Blades.

"HYCARBON" Crosscut Blade.....\$1.60
"HYCARBON" Combination Blade \$1.60
90-day Factory Guarantee

NOW! EVERY "ARCO-SAW" AN ANGLE SANDER & POLISHER

Your "ARCO-SAW" becomes a powerful right angle sander & polisher in just a few minutes. Ideal for removing paint from cars & walls, simonizing cars, polishing linoleum & furniture. Swivel action between drill chuck & gear box permits new freedom of use at any angle on every surface, or when necessary safety-yoke can be used to hold unit rigid. No need to buy an expensive special angle gear drive. New ARCO "SAND-N-POLISH" Attachment consists of flexible molded rubber head, sanding disc, lamb'swool polisher, bottom plate, hexagon adaptor, & also 1/4" adaptor for use in drill chuck.

\$1.95

ORDER TODAY at your dealer or send us check or M.O. (Postpaid).
C.O.D.'s—Postage extra.

UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE

DEALERS—Write for nearest jobber.

ARROW METAL PRODUCTS CO.
DEPT. PS-8, 140 WEST BROADWAY, NEW YORK 13, N. Y.

HIGH POWER TELESCOPE
60 POWER-ALUMINUM TUBES-OPENS TO 33"

Variable Power Eyepiece Adjustable to 15X, 30X and 60X.
Made in U.S.A.

\$4.50

Leather Case Included

5 Sections, 4 Ground & Polished Lenses. Also used as 50X Microscope. Ready to use, only \$4.50 POSTPAID.

BROWNSCOPE CO. Dept. 8P, 24 W. 45th St. NEW YORK 19, N. Y.

Your Finest Buy for HOME, FARM, WORKSHOP!

ELECTRIC HOME-UTILITY TOOLS

DRILLS • SANDER-POLISHERS
LECTRO SAWS • BENCH GRINDERS
HOME UTILITY Division—BLACK & DECKER Mfg. Co.

HOLD-E-ZEE
THE ORIGINAL AUTOMATIC GRIP
SCREWDRIVERS

FIRST CHOICE OF SKILLED CRAFTSMEN

Models for All Types of Screws

At Leading Dealers Everywhere

Gripper Recedes into Handle

Upson Bros., Inc. Rochester 14, N. Y.



Viewer Counts Alpha Rays

ALPHA rays or particles that are emitted by uranium and other radioactive ores may be seen and counted with a new low-cost scintillation counter. The Alpha Counter, made by Clarkstan Corporation, Los Angeles, uses an optical system to gather the light energy given off by the particles.

The counter contains a double-lens eyepiece that is focused on a transparent screen. One side of the screen is coated with phosphor crystals, the other with a layer of tiny glass spheres. As alpha particles strike the phosphor they produce scintillations—tiny flashes of light—that are magnified first by the glass spheres and then by the lens. The flashes are bright enough to be seen under subdued white light.

The counter operates at a constant rate so it can be calibrated against a known sample. It sells for \$5, complete with a red quenching filter and radioactive samples.

Grease Keeps Gaskets in Place

WHILE installing a gasket between two mating metal parts, apply wheel-bearing grease to one metal surface and press down the gasket. The grease will keep the gasket positioned while you complete the assembly. In addition, it helps the gasket form a better seal.—K. Hadenfeldt, Storm Lake, Iowa.

Fruit May Mar Linoleum

WHEN fruit juices are spilled on the linoleum, always wipe them up promptly. These liquids are acid and may discolor the linoleum. Alkalies, such as a drain-cleaning compound, are also harmful and should get the same mop-up treatment.

"Wellworth" Sensational Offer! Reg. \$60.50 WESTINGHOUSE AIR COMPRESSOR

Compressor, pressure tank, air gauge, air chuck, 20-ft. hose, pop valve, copper tubing with 4 brass flared fittings for connecting compressor to tank, 4-way cross and 3 nipples. COMPLETE OUTFIT, wt. 52 lbs.

Equipment less Compressor, \$10.95. Compressor separately, \$21.50
Compressor has 2" bore, 1 1/2" stroke, ball bearing, 3.27 CFM at 600 R.P.M. Capacity up to 6.54 CFM. Size 9"x11 1/2"x6 1/2". Wt. 26 lbs. Ideal for spraying paints, insecticides, etc., inflating tires, operating air tools, and other uses. All new equipment. U.S. government surplus. Replacement parts available. Amazing buy. Don't miss it.

AIR TANK and ACCESSORIES

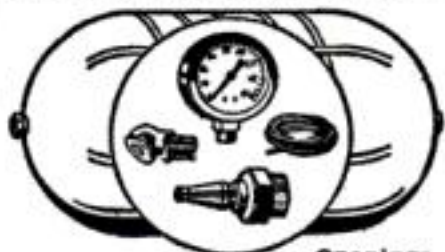
Air receiver, stainless steel, 12 1/2"x24". 400 lb. test. Ideal for carrying on trucks, autos and wherever compressed air is needed. Equipped with 500 lb. air gauge, tire chuck, 3 ft. high-test air hose, air inflation valve with core for retaining pressure in tank, and fittings.

Complete outfit, ship, wt. 20 lbs. **\$6.95**

12" x 24" tank only **\$4.95**

Same outfit with 6" x 24" tank, wt. 10 lbs. **\$4.95**

6" x 24" tank only **\$2.95**



Openings
2-1/4"



"WELLWORTH" V-BELT CLUTCH

Takes starting load off engines or motors. When speed is reached, a flip of handle shifts clutch from idling to driving position. Handles "A" belts, 2.35" pitch diameter, 3/8" bore. Ideal for use with lawn mowers, garden tractors, home workshop motors, etc. 3 1/4" long. Safe, easy to mount, sealed bronze bearings, positive action. Shpg. wt. 3 lbs. **\$7.50**

Same clutch furnished with 3/4" bore **\$8.50**

68 PAGE BOOK—A handy buyer's guide for home and factory workshop. Bargains in motors, air compressors, blowers, electric tools, and many more items. Special luggage section. Big values. Send 10c for postage and handling.

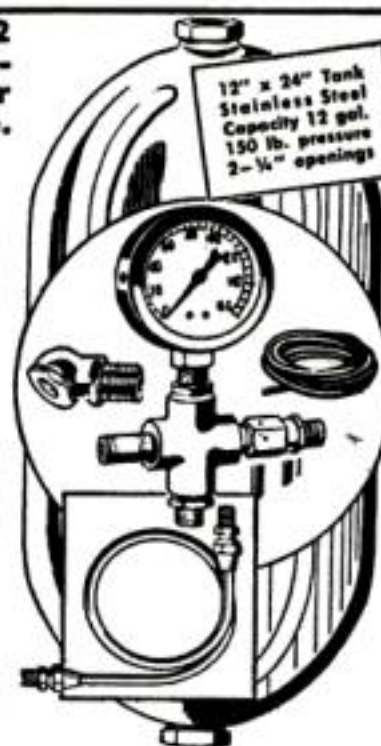
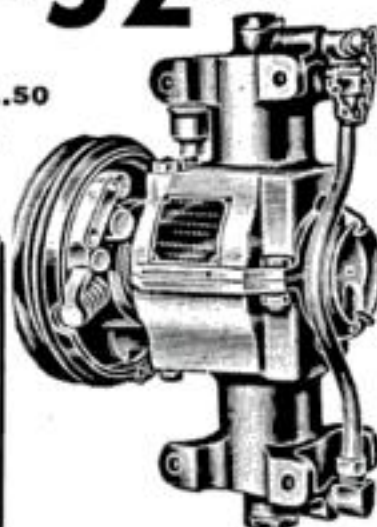
LIGHT PLANTS

Brand NEW!
WAR SURPLUS
Send for
FREE FOLDER

Prices f.o.b. Chicago. Immediate delivery. All items sold on money back guarantee. Send check or money order today.

Model T-1 Brand New — 2 CYLINDER PISTON TYPE. Operates with 1/2 H.P. Motor or equivalent gas engine.

\$32.50



12" x 24" Tank
Stainless Steel
Capacity 12 gal.
150 lb. pressure
2-1/4" openings

"Wellworth" BLOWER BARGAIN



Quiet operating. Double wheel inlet, double width blower. For heating, ventilating, cooling, air washing, exhausting and forced draft. DIMENSIONS: 10" wheel; outlet 13 1/8" x 11 3/8"; inlet 8 3/4". Height 19". Width 18". Depth 16 1/2". C.F.M. 1/4" S.P. 1600; outlet vel. 1575; motor 1/4 H.P. with overload relay; cord & plug, 110 v. 60 cy. AC. Ship. wt. 67 lbs. Special price **\$39.50**

WELLWORTH TRADING CO.

1831 S. STATE ST.

DEPT. B-8

CHICAGO 16, ILL.

POWER MOWERS & KITS

FREE PLANS



LOW FACTORY PRICES
DIRECT TO YOU on

America's finest Lawn Mowers and Easy-To-Assemble Kits and Parts. TRIANGLE Mowers are quality-built and powered high for easy cutting and long wear.

SAVE MONEY 3 WAYS

1. Buy complete assembled mowers in 3 or 4 wheel models, 18" and 20" sizes.
2. You assemble complete mower from our precision built Kits and Parts.
3. Build your own from our FREE PLANS using Triangle Kits, Parts, Engines, Wheels, Etc.

WRITE TODAY for full facts, Free Plans, Parts List, and LOW Factory Prices.

TRIANGLE MFG. CO.
Dept. SG, Box 185
Fort Scott, Kansas



Clark EXPANSIVE BIT

CUTS BETTER • COSTS LESS! Accurate, fast; cuts smooth holes in hard or soft wood. Chrome vanadium steel blades, all chrome body. No. 250, 1/2"-1 1/2", \$1.69; No. 251, 3/4"-3", \$1.89. GUARANTEED. At your dealer or write

ROBERT H. CLARK COMPANY • Beverly Hills, California

Save Time!!! Save Money!!!

SEND FOR THIS BIG, NEW

Woodworkers Catalog No. 17

ONLY **15c** New low prices...great selection of fine domestic and imported woods...bargains in hard to get supplies—144 pages of items and ideas for woodworkers. Quick delivery on mahogany, walnut, maple, cherry, poplar, oak, red cedar, and others properly seasoned, kiln dried. Send 15c for your copy—TODAY.



Dept. B-8
RAFTSMAN WOOD SERVICE CO.
2729 S. MARY STREET-CHICAGO 8, ILLINOIS

SHEET METAL BRAKES

Forms angles, flanges and Pittsburgh locks. 26 gauge steel, heavier aluminum. Cam locking. Portable, can be bolted to bench, or clamped to edge of truck. All steel, reinforced. Shipped exp. coll. 30" size, Wt. 42 lbs., \$26.50 36", Wt. 52 lbs., \$31.00. 48", \$45.00 Floor mountings, portable, 29" high, \$7.00. 12" BRAKE. Fits in vise to form difficult compound bends, up to 20 gauge steel. Not Illustrated. **\$12.50 P.P.** 18" CURVE FORMER, Capacity—16 gage steel **\$10.00** SHEET METAL PLIERS, 2 1/2" wide, \$2.00; 5", \$2.50. Immediate delivery. Order direct, cash or C.O.D., or send for folder.



30 AND 36 IN.

VICE BRAKE MFG. CO., 5-1116 So. 27th St., Omaha 5, Nebr.

for POWER, LIGHTS, WELDING Pays BIG Profits!



Do your own welding, run motors, lights, and tools. Ready on a moment's notice. Be independent of electric power lines on big profitable outside repair jobs and emergency lighting requirements. Brings in extra money-making jobs. Send now for details on how easy you can use this new low cost 2 in 1 unit, no obligation.

PAYS FOR ITSELF TERMS AS LOW AS \$18 MONTHLY

"BUILD YOUR OWN" combination arc welder and power unit using this AC-AC Generator. Complete, ready for hook-up to your own gasoline engine, tractor or truck. Makes a BIG saving in first cost. Also available in DC of different sizes. Write today.



HOBART BROTHERS COMPANY, BOX P-80, TROY, OHIO • Write for Free Catalog

★ Fell a tree like this in less than a minute with a McCULLOCH



New One-man POWER SAW

Finest gasoline-powered chain saw for all tree work, wood cutting, land clearing, etc. Use it to fell, buck, or rip. For trees up to 3-foot diameter. Weighs only 25 lb., develops full 3 hp. Starts instantly. Cuts in any position — take it anywhere. Send for free data.

\$295.00
f.o.b. Los Angeles

Endorsed by professional loggers everywhere

NATION-
WIDE
SALES
and
SERVICE



McCULLOCH MOTORS CORP.

6101-A West Century Boulevard
Los Angeles 45, California

SEND FOR FREE LITERATURE

ONLY \$5.95 Amazing FOREDOM PRESTO-FLEX

Turns motors, or electric drills into flexible shaft tools! Pencil-size handpiece, 35" overall length. Attached or removed in a jiffy. For use on motor add 50c for coupling, available for 1/4, 5/16, 3/8, 1/2" motor shafts.

WRITE FOR FREE CATALOG 1032-E

FOREDOM ELECTRIC CO., Dept. 1032-E
27 Park Place New York 7, N. Y.

MOTOR OIL SHOULD NOT BE CHANGED!

Learn WHY! Send for FREE 32-page booklet. Mention year and make of your car, truck or tractor.

RECLAIMO MFG. CO., Inc., 5083 Elston, Dept. 37, Chicago 30, Ill.

ARC WELDING FOR PROFIT OR PLEASURE

60 LBS. OF READY MADE PARTS

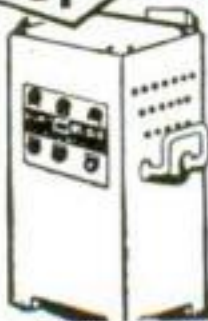
**BUILD YOUR OWN
HEAVY DUTY WELDER**

All parts Ready-Made and easy to assemble. You can do all around welding on steel, cast iron and other metals after only a few hours practice. Illustrated instruction manual included. Sold on 30 Day Money-Back Guarantee!

FREE: Write today for fully illustrated Pamphlet S-8.

ATOMIC ARC WELDER CO.
1039 So. 19th St., OMAHA, NEBR.

Gives 100% penetration. Welds are stronger than original metal. Operates on 110 or 220 AC.



WE MADE A FABULOUS BUY... AIRCRAFT GENERATORS AND WERE PASSING IT ALONG TO YOU! NOW! YOU CAN BUILD YOUR OWN ARC WELDER FOR ALMOST NOTHING CONSIDERING ITS VALUE

These Jack & Heintz, finest precision built R.I. Generators, used on B-29's cost the Government approximately \$400.00. Gives from 300 to 400 amps at 27V. Ideal for all welding, light and heavy up to 5/8" thickness.

FREE complete instructions for conversion of this Generator to welding unit. **R-1 NOW ONLY 17.95**

Other AIRCRAFT GENERATORS

That can be made into Arc Welders.

P-1	27 Volts	200 Amps	15.95	E-5A	12 to 15 Volts	50 Amps	12.95
1273-1A	27 Volts	75 Amps	12.95	03	27 Volts	100 Amps	25.00

K-21 AERIAL CAMERA

Equipped with 12.5 E.K. Aero Ektar 7" focal length Coated Lens. 24 Volt D.C. Electrically operated, complete with motor, cables, filter and carrying trunk. Lens alone is worth over \$250.00 and can readily be adapted to 4 x 5 Press type camera. Don't miss this chance to own the "Pride" of professional color photographers **\$79.00**

ARMY RE-ISSUE - CAMERA COMPLETE



VT-1



VICKERS HYD. TRANSMISSION

Self contained, 2 H.P. constant torque at all speeds with variable volume reversible, piston pump (controlled by outside lever) supplying piston hydraulic motor. Automatic pressure, dash pot for smooth control. Power output R.P.M. - 0 to 1/3 input R.P.M. in both directions. Input R.P.M. - 1800 continuous 4000 intermittent. Dash pot can be removed for greater R.P.M. Ideal for Lathes, Duplicator setup on Mills, Conveyors, Small Cars, Drives, Gearing, etc. Includes two 4" Spline Shafts for input and power take-off. Cost Government approx. \$400. **25.00**



ELECTRIC ACTUATORS

These have hundreds of uses for any mechanical device that needs a controlled two-way action, such as raising and lowering or opening and closing doors, windows, gates, shutters, valves, etc.

CTU-1 Lear No. 400A linear actuator. 24 Volt D.C. motor, 20,000 R.P.M., approximately 1/30 H.P. Drives the actuator through a high reduction gear box, resulting in 4 1/2" stroke in 14 seconds. Compression and tension loads up to 300 lbs. Has adjustable micro switch for limits of travel. Overall length retracted 10". A highly precise instrument **ONLY 7.95**

CTU-2 Foote linear actuator. 24 Volt A.C. or D.C., 8500 R.P.M., 1/6 H.P. Series wound motor, 4 1/2" stroke in 13 1/2 seconds. Compression and tension Loads up to 750 lbs. Adjustable micro switch for limits of travel. Overall length retracted 11" **ONLY 6.95**



MOTORS

HEAVY DUTY G.E. GEAR HEAD MOTOR - 1 1/2 H.P., 24 Volt D.C., 125 Amp reversible motor drives reduction gear box unit 44.5 to 1, resulting in 168 R.P.M. at 5/8" diameter take-off shaft. Motor contains electro magnetic break.

UNIT COMPLETE **10.95**
GEAR BOX ALONE **7.95**

MOTOR ALONE **4.95**

DUMORE ELECTRIC MOTOR. Adaptable to rigid or flex drive, 400 R.P.M. at power take-off. Contains 1/25 H.P., 24 Volt, 7 1/2 Amp reversible motor for indicating position. Has limit switches, magnetic brake, resistor to coordinate instrument. Overall dimensions - 8 1/2 x 4 1/2 long. **Only 7.50**

LEAR ELECTRIC MOTOR. 24 Volt - 6 Amps, series wound reversible motor with overload clutch. Motor turns 11,000 R.P.M. Has 11 to 1 gear reduction box turning 1000 R.P.M. at take-off. Adaptable to flex or rigid drive. **7.95** Has limit switch box. Size 10" x 4".



We have available various fabricated lengths of Flex-Drive to fit Lear Gear Head motors, at 40c base price for end fittings, plus 20c per ft. EXAMPLE: 48" cable total sale price \$1.20.

REMOTE INDICATING SELSYN MOTOR. Will operate on 115 Volt, 60 Cycle A.C. 2 1/4" diameter, 4" length. Works on simple electrical connection and can be used for any distance. Turn shaft of one unit and the other will follow accurately. Can be used on TV and Ham antennas, lens focus, weather vanes, film footage and liquid levels, etc. **\$2.95 PAIR**



SAMSELL MOTOR - 27 Volts, 16 Amps. 1.5 H.P. reversible, series wound on motor. 3800 R.P.M., shaft 9/32" diameter. 12-spline, 4-1/8" x 2-3/8". **ONLY 3.95**

TERMS: Order from this Ad. All sales final. All Prices F. O. B., Glendale. Pay by N. O. or Check. P. O.'s accepted from D & B. firms. 1/3 deposit with C. O. D.'s

PALLEY SUPPLY CO 6321 SAN FERNANDO RD.
Dept. PS-8
GLENDALE 1, CALIF.

92 PAGE CATALOG
War Surplus - Tools, Machinery, Raw Materials, Clothing, etc. Illustrated with valuable info., tables, charts & data. Send 25c to cover handling & postage.

SAVE UP TO 85% IN WAR SURPLUS

Order from this Ad. All sales final. All Prices F.O.B. Los Angeles. Pay by M.O. or Check. P.O.'s Accepted from D & B Firms. 1/2 deposit with C.O.D.'s.



PALLEY FAMOUS MIXES!! Prepared especially for the HOME CRAFTSMAN, HOBBYIST, INVENTOR, GADGETEER or SHOP MECHANIC.

GADGET MIX - Rivets, Spacers, Bolts, Screws, Gears, Wheel bearings, Springs and Clamps. No. 106, 5 lbs. **1.19**

BEARING MIX, No. 170A. Approx. 20 needle, Ball & Roller Bearings, New & Used. Sizes: 1/2" to 4". Some of these cost Gov't \$10 a piece. Never such a value! 5 lbs. ONLY **1.59**

HINGE MIX, No. 170H. 12 pairs of Strap and butt hinges, Hasps, 1" x 1" to 7/8" x 10" in length and 8" strap. 2 lbs. **1.09**

ABRASIVE AND GRINDING WHEEL MIX - 50 pieces including honing stone, pencil rolls, wheels, etc. A sharp value. No. 170AG **99c**

SPRING MIX, No. 206 - Torsion, Compression & Tension Springs. Ass'd. sizes. A treasure trove for emergencies. Scores of springs. 5 lbs. for ONLY **1.69**

RIVET MIX - 3 POUNDS - Consisting of sizes from 1/4" long to 3" long in many diameters & alloys. **1.19**

FILE MIX - Ten assorted Files, 4" to 12", includes 3 Vixens, half rounds bastards, mills, etc., in seconds and used but in good condition. 1 Vixen alone worth our price for entire mix. F-1 **99c**

PULLEY MIX, No. PM-1 - You'll want this one around. 10 micarta & metal pulleys ranging from 1" to 5" with ball and one piece bearings. These are aircraft pulleys, the best made with 100's of uses. A WONDERFUL BUY!!! **2.95**

COUNTERSINK MIX, No. 168. Wide assortment. Excellent condition. High speed steel. Assortment of ten 100 and 110 with pilot sizes ranging from 3/32" to 3/16" No. CM-1 **2.69**

SCREW MIX - 5 lbs. incl. 2 1/2 lbs. wood screws & 2 1/2 lbs. machine screws. All sizes. Save dollars and always have plenty of screws on hand. **1.39**

NUT MIX NM-1 - 3 lbs. approx. 500 nut. Anchor, Lock, Castle, Hex, Elastic Stop Nuts, etc. You'll always have plenty of Nuts in the shop. NM-1 **1.39**

SUPER COMBO MIX - No. SC2. Here's a real bargain. All eleven above mixes for ONLY **14.95**

REAMER MIX - No. 168. Reamer assortment: Special Taper line finish Reamers. High Speed Steel. Slightly used but in excellent condition. Ten assorted sizes ranging from .168 x .165 to .244 x .215 to .425 x .385 & .432 x .403. One alone worth our selling price of ten. For set of ten Reamers . . . **4.49**

METAL SNIPS - Hard steel blades. Comp'd action. Expansion spring and locking device. Right and left hand types. **NOW 2.59**

15 MONKEY WRENCH
Adjustable Jaw - Opens to 4"
Drop Forged. Auto Type.
Cadmium Plated **89c** Black **79c**

PIANO HINGE
Overall Width Length Price Ea.
1 1/4" (5/8" side) 72" alum. \$1.00
2" (1" side) 9" alum. \$1.75
3 1/2" (1-3/4") 54" st. steel \$1.69
BRASS HINGE - 1 1/4" (5/8" side). 040
Any length at **29c per ft.**

PALLEY SUPPLY COMPANY
4371 SAN FERNANDO RD.
DEPT. PSB GLENDALE 1, CALIF

UTILITY BOXES FOR HOME - OFFICE, SHOP, ETC.
PLASTIC
Transparent, with hinged lid & 25 watertight compartments. Ideal for fishing kits, small tools, cosmetics, etc. All 3 for ONLY **1.49** per set

TWO HEAT SOLDERING IRON
World's Hottest Iron Value!
Two soldering irons in one with button heat control. Push the button - Select 150 or 300 Watt heat for light or heavy work. Complete with tip, bench holder, 5' asbestos cord, 110V AC. A \$15.00 Value For . . . **3.95**

INSTRUMENT MIX
6 DIFFERENT TYPES
Contains 1 each of the following items:
Flight Check-off • Position Indicator
Selsyn Fuel Gauge • Air Speed Indicator
Fuel/Air Ratio • Oxygen Regulator
These instruments contain sensitive meter movements, jewels, bearings, gears & valves. **COST THE GOV'T MORE THAN \$500.00**
SPECIAL!! ALL 6 FOR ONLY 5.95

Sperry Aircraft Directional GYRO COMPASS
Dial is 360° swing calibrated 1/10° (6 min.) per 1°
Mount 4 1/2" square with 3" luminous dial. Can be used in autos, planes, or boats by attaching one tube to intake manifold for required vacuum. Complete with reset coping knob. Gov't. overhauled - ONLY **\$4.49**

TACHOMETER - Type C-9A. Operates on direct drive with flexible shaft. Range is 0 to 4500 RPM. Ideal for use on single engine planes or boats, autos, etc. Drives direct from camshaft or at 2-1 reduction from crankshaft. **\$4.75**

FIRE EXTINGUISHER
Kiddie Lux CO2 Type. Built to Gov't spec. Shatter-proof, heavy case. Fully re-charged. with horn
No. 602A - 7 1/2 lb. \$35 Value. **19.25**
No. 603 - 10 lb. A \$65 Value. . . **25.75**
No. 605-A - 15 lb. New. Break disc Type. A \$75 Value . . . **29.75**
No. 605-B - 15 lb. Wheel Control Type **32.95**
No. 605-C - 15 lb. New. Squeeze Grip Type. \$85 Value. . **39.95**

Note: Weights listed are capacity extinguisher charge.

2 TON WINCH
Can be Hand or power operated. Has large capacity steel drum for cable. Powerful gear - reduction drive and manual brake. **36.50**

AIR COMPRESSOR
High Pressure
General Electric, 2 stage AC - DC. Rated pressure 1000 lbs. per sq. in. with 1/3 H.P. 27 volt, 7 AMP series wound motor with fan for cooling. Thousands now in use for spraying, inflating, laboratory use, etc. Can be adapted to 110 volt A.C. with transformers
A tremendous value at approx. 5% of original cost **22.50**
We also have transformers for above.

RIVET GUNS
Pistol & Gooseneck Type
Gooseneck **\$8.95**

ALUMINUM
"Odds 'n Ends" box for sportsmen, shop, or house. Decorative and sturdy. Aluminum construction.
13 1/4 x 11 1/2 x 4 **2.75**
12 1/2 x 10 1/4 x 6 **2.69**
7 1/2 x 5 x 4 **99c**

RAWHIDE Mallet
For working soft metal, or plastics, driving pins, etc. Weight 2 1/2 lbs., metal collar with rolled leather insert head **1.09**

UTILITY HAMMER
For use as masonry chisel, stake driver, sledge, etc. Head special forged steel, sharp cutting edge. Handle is select hardwood.
1 1/2 lb., 14" handle **79c**
2 lb., 21" handle **99c**

AUTO PULSE PUMP - Ideal for fuel pump for auto or boat. 24 Volt D.C. Can be adapted to 6 Volt D.C. 1/8" stand-and pipe parts **5.50**

WHEELS For Wagons, Dollies, Handtrucks, Wheelbarrows, etc. 10" dia., with 1/2" center hole. (can be drilled out to take 5/8" axle) Wheel is 1/8" steel with 10 x 1.75 heavy duty, semi-pneumatic cushioned rubber tire. **\$1.75**

1/4" CLARK ELECTRIC DRILL. Heavy duty. Reconditioned, made to rigid Gov't spec's. 110V A.C., 60 cycle, 1 phase, ball bearing motor, 5,000 R.P.M., 1/2" Jacobs Chuck, 8 ft. cord, plug. **15.95**

2 SPEED PORTABLE MOTOR-ENERGIZER. Used as auxiliary power source, to actuate starters or as principal power source. 1001 uses as high speed drill motor, power booster, etc. Has governor, 50 ft. electrical cable. Length 34". Power A.C., 110-115V 60 Cycle, D.C. NEW
AN ELECTRIFYING BUY! **27.50**

ADJUSTABLE TAP WRENCHES
Jaws are made of tool steel, hardened & tempered. Won't break or get out of line.
#37 Threadwell Cap. 1/4" to 1 1/8" Length 19" **\$2.49**
#8 Vermont Cap. 3/4" to 1 5/8" Length 40" **\$3.49**
#24 Greenfield Cap. 1 3/4" to 4" Length 72" **\$6.49**

AIRCRAFT CABLE
Rust resistant alloyed steel, extra flexible, prefarmed - 7 x 19 strand on reels.
1/16" 3c ft. 1/4" 8c ft.
3/32" 4c ft. 9/32" 9c ft.
1/8" 4 1/2c ft. 3/8" 12c ft.
5/32" 5c ft. 1/2" 15c ft.
3/16" 6c ft. 1/4" Bronze 14c ft.
1/8" Stainless Steel 12c per ft.
1/4" Stainless Steel. 21c per ft.
Aircraft control cable 18 ft. long, 3/16 in. diam. with turnbuckle ends. **99c**

Neoprene Sheet Stock RUBBER
Thickness Approx. Width Price per run yd.
#325 .020 1/64" 36" \$1.75
#326 .032 1/32" 22" 1.38
#330 .064 1/16" 36" 2.39
#331 .093 3/32" 36" 3.39
#329 .125 1/8" 46" 4.75
Note: No. 329 is Laminated rubber sheet with cloth center.
No. 332 - Grey Neoprene Rubber Floor Mat. Has raised non-skid Diamond pattern with durable cloth backing. Stock size: 36" x 48" x 1/16" thick **\$1.95 ea.**

SEND FOR 72 PAGE TOOL CATALOG

NEW HYDRAULIC CYLINDER SPECIAL
20,000 lb. thrust (push pull) using 1500 PSI line pressure as obtained from our hyd. pumps. Or will produce 40,000 lb. thrust with 3,000 lb. line pressure. CAN ALSO BE OPERATED ON LOW PRESSURE AIR SYSTEMS. 4" Bore, 1 1/2" dia. piston shaft, 18" stroke, length 30 1/2". Equipped with ball bearing loaded clevis type mounting and swivel type high pressure steel pipe bracket for easy use. Ideal for road, farm & shop machinery, presses, etc. Cost Gov't \$390.00 **22.50**

No. 9-E HYDRAULIC CYLINDER
Double action cylinder. Has a bore of 1-3/8" and shaft of 1". Stroke is 9". Overall length 15 1/2". Built for 1500 lbs. continuous duty, 3000 lbs. intermittent duty. Will lift or push up to 2300 lbs. Can be adapted to hundreds of jobs. **NOW 8.95**

No. 3 HYDRAULIC CYLINDER
Double action. Bore is 1". Shaft 3/8". Has a stroke of 2 1/2" to 4". Stroke can be adjusted with internal sleeve stops. Overall length is 8 1/2". Will take 1500 lbs. continuous duty. 3000 lbs. intermittent. Will lift or push up to 1100 lbs. **3.75**

4-WAY VALVE
Poppet Type. Valve shuts off at neutral position. Has 3/8" AC Tube Ports - 9/16 20 thread. Will stand 1,500 P.S.I. **4.75**

BENDIX HYDRAULIC HAND PUMP
Provides an instantaneous source of tremendous power for almost any heavy work. Double action stroke. Delivers .30 cu. in. per cycle at 3000 PSI. Max. press. 5000 PSI. Built-in Reservoir cap. 2 1/2 qts. 3/8" pipe outlets. Has Pressure Release Valve. 7 1/2" dia. by 23 3/16" overall ht. Weight 15.2 lbs. A \$40.00 Value for . . . **13.95**
IN EXCELLENT CONDITION

Hydraulic PUMPS
Logan Generator type. For operating hydraulic systems on trucks, tractors, etc. Delivers 8 GPM at 1200 RPM, at 1000 PSI with 5 HP. Can also be used as Hydraulic Fluid Motor. Has 3/8" stand pipe ports, 1/2" splined shaft for pulley or direct attachment. 5 1/2" dia. by 7" long. Used, but condition guaranteed. **ONLY 17.50**

VALUABLE GEAR BARGAINS
6 to 1 with screw shaft #111 **\$4.98**
85 to 1 (can be used for radio, antennae, etc.) **\$3.95**

GEAR BOXES VTG-1 - 90°. bevel gear 1 1/2 to 1 reduction. size 7" x 6". A Life-time Value. **\$3.95**
VTG-2 - Inline spur gear 16 to 1 reduction, thru 4 gears. Final take-off 4 1/2" dia. 26 tooth. 1/4" Alum. spur gear. **\$6.49**
Both above gear boxes have lever control for engaging & disengaging positive clutch. Rust proof housing. Pre-lubricated bearings. Both can be adapted to Vickers Transmission.

ELECTRONIC TRANSMISSION GEAR TRAIN
GT-1 Containing approx. 50 Bronze Spur & Pinion Gears - ranging from 3/8" to 4" dia., 5 sets of 7 cluster gears, 2 complete worm & worm gear drive sets, 40 N.D. ball bearings from 1/2" to 1 1/2" dia., watch springs, bushings, posts, face plates, housings - Micro Switches, 2 miniature, controlled-clutches, etc. Gears are in multiple size & sequence, identical teeth ratio, giving 100's of gear reduction combinations. Wt. 19 lbs. **\$8.49**

AMAZING NEW 3 SPEED

• BUFFER
• SANDER
• POLISHER

Fits Any $\frac{1}{4}$ " Drill



Now you can buff, sand, grind and polish at exactly the right speed with your electric drill. New, exclusive 2 Speed Right Angle Drive gives just right speed for each operation—DOUBLE speed of your drill for fast sanding etc.; HALF speed for added power and high luster polishing; Direct Drill Speed for run-of-mine work. Swivel action between drill chuck and angle drive permits use at any angle or any surface.

SANDS, POLISHES CAR, FURNITURE, WOODWORK

Even an inexperienced operator can get professional results with the Worksaver kit and exclusive 2 Speed Right Angle Drive. Buffs, sands, grinds, polishes car body, woodwork, furniture, floors, metals. For home and shop use, garages and body shops, farms, service stations, machine and cabinet shops, building maintenance and other uses. Right angle head contains heavy duty, steel cut gears, packed in grease. Will give long hard use. Complete kit contains:

Right-angle drive 2 speed unit
Flexible molded rubber head
Direct drive adaptor, cup washer, screw
Polishing bonnet, highest grade lambs wool
Heavy-pile carpet compound rubbing pad
Three sanding discs—coarse, medium, fine grits
Full directions

Full money back guarantee. Send only \$7.95, cash, check or money order. Postpaid anywhere in U. S.

ONLY
\$7.95
POST PAID

DIRECT DRIVE

Polishing and Sanding Kit

Designed for use with any electric drill. Kit contains: Rubber head with cup washer, screw and adaptor; highest grade genuine lambs wool polishing bonnet; medium grit sanding disc. Ideal for use with chuck and drill bench mountings and for $\frac{1}{4}$ " electric drills. Operates at drill speed. Full money back guarantee. Postpaid anywhere in U. S.



ONLY
\$1.49
POST PAID

DEALER INQUIRIES INVITED

LAKE SALES, INC.

6536 Carnegie Avenue

Cleveland 3, Ohio

METAL REPAIRS ARE EASY

WITH

KESTER METAL MENDER
(GENUINE TIN LEAD SOLDER)

FREE "HOW TO SOLDER BOOKLET"

Send for yours today. "Soldering Simplified"... 16 pages crammed with instructive photographs and step-by-step explanations of how to do good soldering.



25¢ IN MOST AREAS

KESTER SOLDER COMPANY

4254 Wrightwood Ave., Chicago 39, Ill.
Newark, N. J. • Brantford, Canada

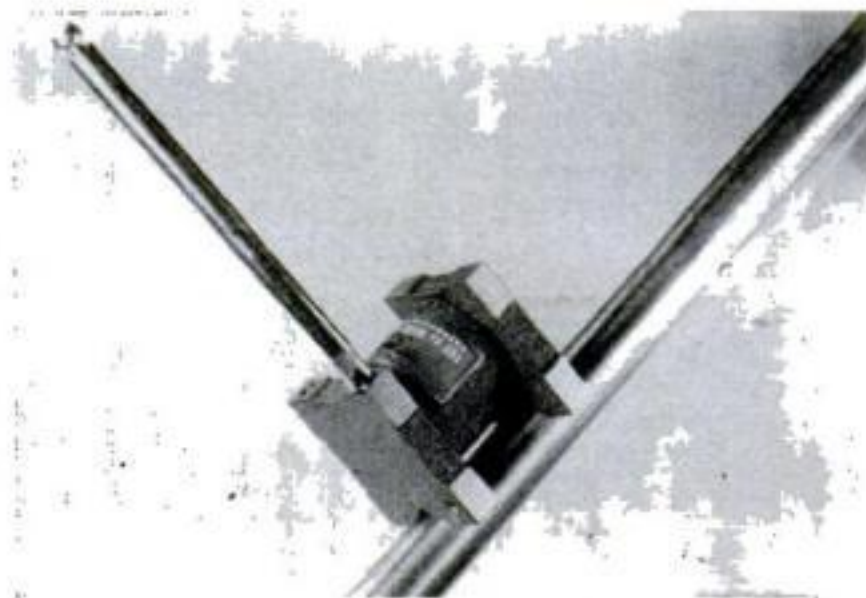


New



Hacksaw Is Spring Loaded.

Here's a radically new hacksaw that lets the blade do its work without interference from the frame. Cuts well in from the edge of the stock are possible. A spring enclosed in the barrel returns the blade after each stroke. Made in England, the tool is sold in the United States for about \$4 by Ziskind Co., Inc., New York City. With a starting hole, the saw can be used to cut out sections of floors, wall panels, or doors. The saw takes either 10" or 12" blades. The back of the blade is clamped in the pistol-grip section, and at the front end of the frame it rides between three hardened steel balls.



Magnetic Base for Gauges. The base of this machinist's measuring attachment is an Alnico permanent magnet with a 40- to 50-lb. grip on all four sides. Interchangeable brass shafts— $\frac{7}{32}$ " and $\frac{5}{16}$ " in diameter—are provided for a dial indicator or height gauge. The base has V slots on one side for holding to a round surface. Manufacturer of the attachment is the du Mont Corporation, of Greenfield, Mass.

Tools



Electric Hand Saw. In the photo above, a groove is being cut in a concrete floor with a 6" portable electric saw fitted with an abrasive wheel. After the cuts were made, the concrete in between was knocked out and a copper oil line laid. Maker of the 1-hp. saw is the Milwaukee Electric Tool Corp., of Milwaukee. Fitted with a 6" steel blade, the saw also cuts wood and metal. Maximum cut is 2" and it makes miters.



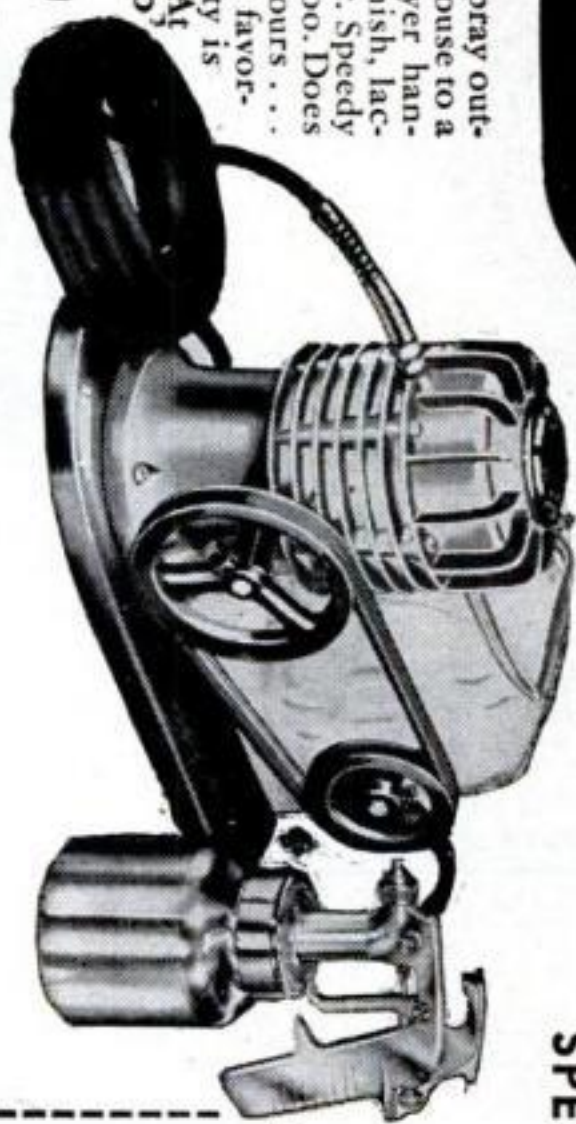
Automatic Punch. Feature of this spring-actuated center punch is the micrometer-type adjustment that varies the impact pressure from 5 to 35 lb. In addition to the standard layout point of tool steel, there are accessory points available, including a tungsten carbide one for hard steel and another for riveting. The maker is Vinco Products, Asbury Park, N. J.



Here's a real "professional" spray outfit that paints anything from a house to a toy! In addition, Speedy Sprayer handles any material—enamel, varnish, lacquer, calcimine, insecticide, etc. Speedy Sprayer saves time and money, too. Does any job in *minutes* instead of hours... makes paint go further. It's the favorite sprayer whose dependability is proven by 20 years of usage. At hardware, paint, lumber or auto supply dealers.

W. R. BROWN CORPORATION
CHICAGO 39, ILL.

Specialists in Portable Sprayers for Over 20 Years!



Speedy Sprayer

Heavy duty all-purpose paint sprayer for Hobbyists, Mechanics, Home Owners who demand superior performance and results!

SPEEDY SPRAYER 890

Delivers 2 cu. ft. per minute, clean, oil-free air at 30-40 lbs. pressure. Operated by any 1/4 h.p. motor. Never needs oiling. Complete outfit—gun, valves, nozzles, air hose, less motor,

now only
\$26.50

Free

W. R. Brown Corporation
5718 Armitage Ave., Chicago 39, Ill.
Free Booklet "How to Spray". Also Speedy Sprayer literature.

Name _____

Address _____

City _____ State _____

BUILD YOUR OWN COOLING FANS

EXCLUSIVE GIL-BILT BUILD-IT-YOURSELF FEATURES

- Engineered for home construction by world's leading manufacturer of build-it-yourself power tools.
- No machine work. Build easily with hand tools only.
- No guess work. No blueprint reading. Step-by-step pictorial plans, full size patterns, actual photographs.
- Sturdy wood & plywood construction, engineered for reduced noise and vibration.

SAVE UP TO
\$50
OR MORE

GIL-BILT 24 INCH WINDOW FAN

- Two heavy OILITE oilless bronze bearings
- 24 inch TORRINGTON 40 degree pitch aluminum blade
- Pedestal mount for blade and pulley simplifies construction. Shipped ready to run.
- Mounts out of way on outside of window.
- Belt driven with any 1/6 or 1/4 h.p. motor.
- Rubber cushioned mounting brackets reduce noise, simplify installation.
- 5000 C.F.M. at 620 r.p.m. cools 4 or 5 room house.



GIL-BILT KIT #520-A Includes Plans, TORRINGTON rustproof blade and V-pulley mounted ready to run on cast aluminum pedestal. V-belt, motor pulley, mounting brackets, plus all necessary screws and bolts. (less motor and wood for wood parts)..... **\$19.95**
GIL-BILT Plans #520, Full Size Patterns..... .50

GIL-BILT 36 INCH ATTIC FAN

- Molded rubber cushions minimize vibration.
- Soundproofed ball bearings, sealed against dust and dirt.
- Efficient 36 in. Torrington Steel Blade.
- Horizontal mounting makes installation easier.
- Rubber cushioned mounting brackets reduce noise.
- 9000 C.F.M. with 1/3 h.p. motor. Cools entire house.



GIL-BILT KIT #510-A Includes Plans, bearing blocks, 3/4 inch steel shaft, Torrington blade, two V-pulleys, V-belt, rubber cushions, mounting brackets, plus all necessary screws & bolts (less motor & wood for wood parts)..... **\$25.95**
GIL-BILT Plans #510, Full Size Patterns, Installation Instructions 1.00

NO DEALERS—One Low Factory Price! Prices include postage within 600 miles. Over 600 miles add 5%. Send cash, check or money order for fan kit, or send for Plans now and order Kit later less cost of Plans. Also available: 20 in. ROOM COOLER FAN, MOTORS, and BLADES. Write for **FREE** descriptive folder.

GILLIOM POWER TOOLS

P. O. BOX 1-HV Lambert Field St. Louis 21, Mo.

SOUTH BEND

LATHES
DRILL PRESS
SHAPER



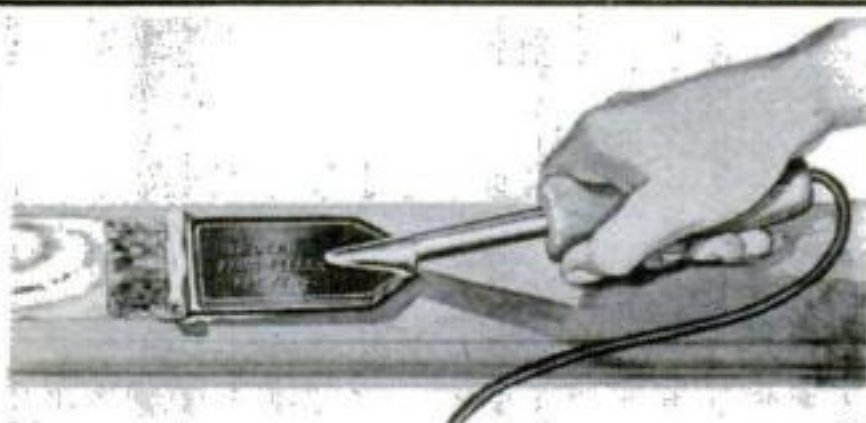
9" to 16-24"
Lathes

14" Drill
Presses

7" Bench
Shaper

Write for literature—indicate machine.

SOUTH BEND LATHE, SOUTH BEND, IND.



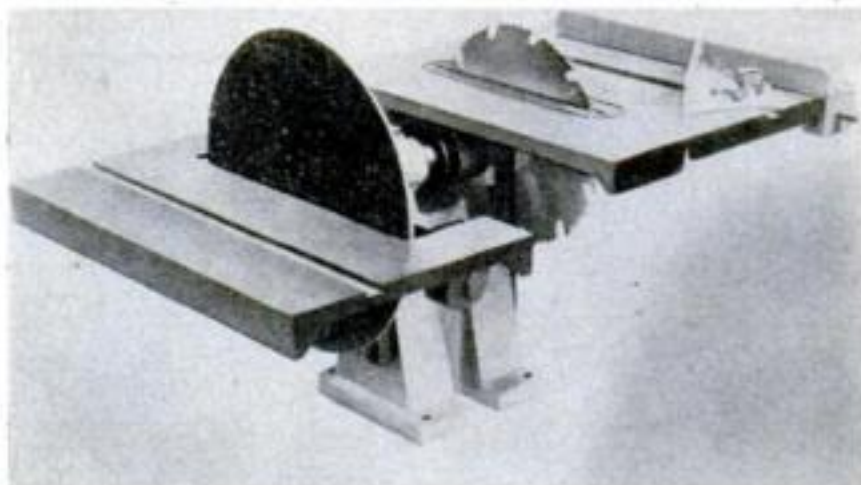
PEEL PAINT TO BARE WOOD WITH ONE EASY STROKE

NEW ELECTRICAL TOOL removes 1 to 10 or more coats of paint from any wood surface as easy as cutting butter with a hot knife. No scraping, cutting, burning, sanding, or chemicals. The new Lectro Paint Peeler instantly softens paint electrically and peels it off the surface clean to the bare wood with one easy stroke. It's faster than a blow torch—there's no danger of fire—will not scorch or burn delicate wood surfaces. Makes no mess—no smell—it's even fun to use. Removes any paint, enamel quickly and easily. Sturdily constructed to last for years. Sent complete with extra long, quality electrical cord. Simply plug into any A.C. or D.C. outlet—let heat for several minutes and remove paint to the bare wood on exterior or interior painted surfaces, floors, woodwork, cupboards, furniture, antiques, boats, window-sills, screens, doors—a hundred other uses. Price \$4.95 postpaid—nothing else to buy. Full money back guarantee. For immediate shipment—send check, cash or money order to:

LECTRO WELD, INC.

5700 Detroit Ave. Dept. PS-8 Cleveland 2, Ohio

New Tools

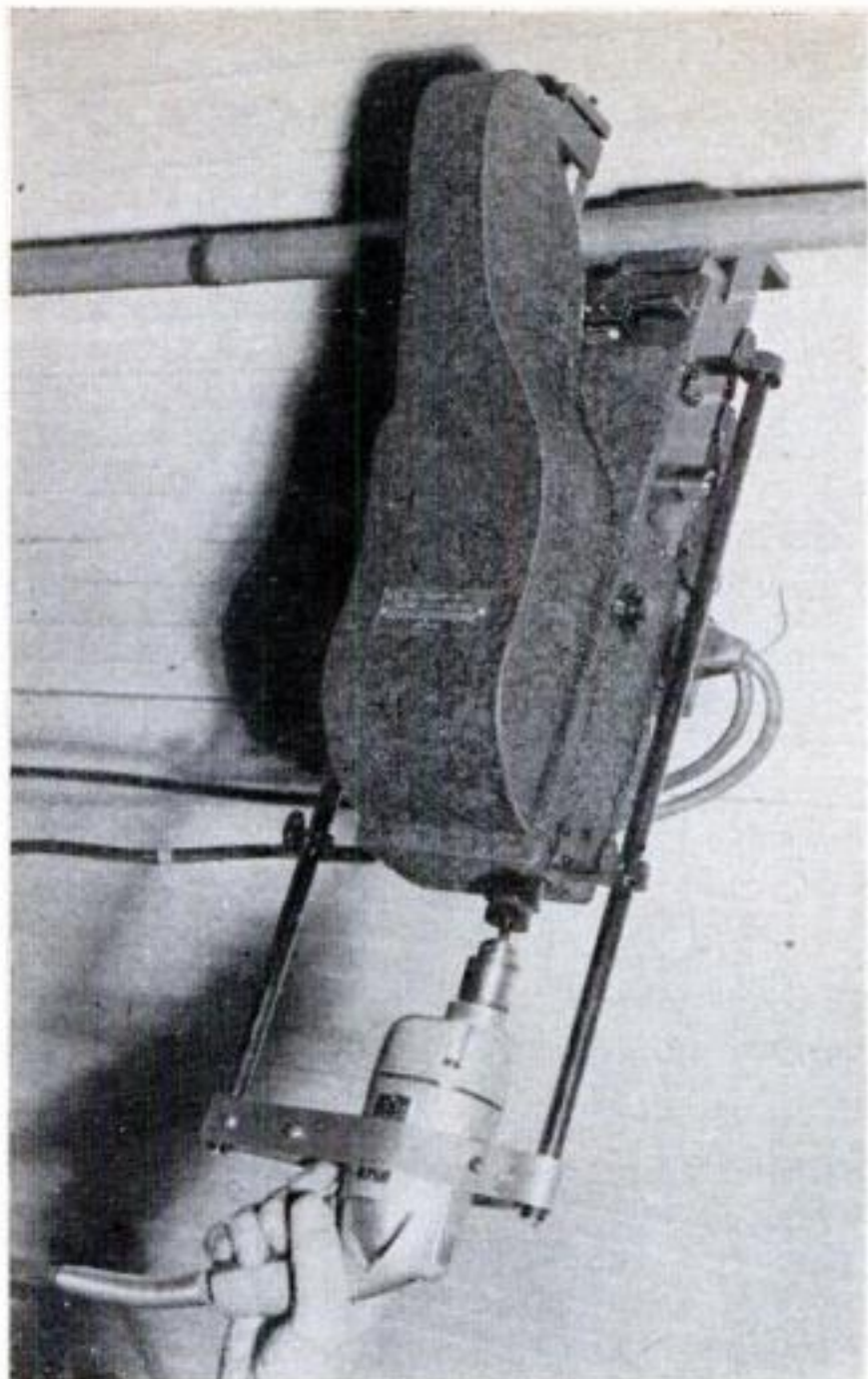


Sander Combined with Saw.

Duo-Master Industries, of Sparta, Mich., prices this combination 8" bench saw and 9" disk sander at \$27.50. The unit includes rip fence and miter gauge. Both tables tilt from zero to 45° and both can be removed for mounting accessories. The saw table is adjustable in height for cutting dadoes and rabbets. Weight of the unit is 16 lb. and the over-all dimensions are 12" by 13½" by 21".



Bar Salvages Lumber. This wrecking bar is designed for the removal of old flooring, siding, and sheathing without damaging the tongue and groove. It's made by Decatur Steel Products, of Decatur, Ind. A thrust of the steel lever first raises the tongue side of a board and then draws it outward and disengages it from the next board. It can be used astraddle single joists or adjacent to double joists. The bar weighs 6½ lb., is 25" long, and handles boards up to 8" in width.



Power Hacksaw Is Portable.

Powered by any standard electric drill, this hacksaw cuts pipe or metals up to 2" in diameter. The Zina Goodell Corp., of Salem, Mass., prices the tool—less drill—at \$75. The saw weighs about 22 lb. but is easy to use because it is clamped to the work. It takes a standard 10" blade, has a 5" stroke, and delivers 200 strokes per minute when the drill speed is 1,250 r.p.m. For light work that's easily portable, the saw can be locked in a vise and used as a bench tool.

Expansive Bit Has Dial. Diameters can be accurately and quickly dialed with this expansive bit made by the Irwin Auger Bit Company, of Wilmington, Ohio. The

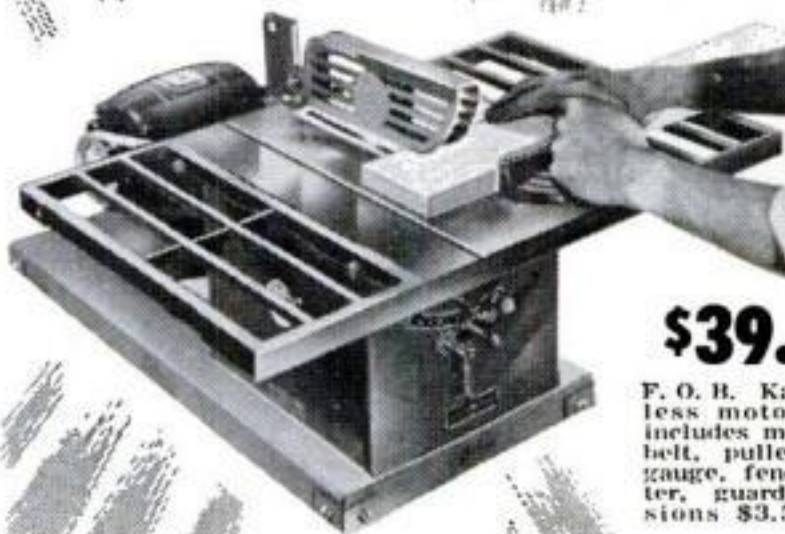


bits are available in two sizes with cutting ranges from $\frac{1}{8}$ " to $1\frac{3}{4}$ " and from $\frac{1}{8}$ " to 3". Graduations on the dials are by 16ths of an inch. The bits are drop forged and heat treated for the full length.

TODAY'S GREATEST SAW VALUE!

DOUBLES
YOUR
WORK
RANGE!

TRIPLES
YOUR
FUN!



\$39.50

F. O. H. Kalamazoo, less motor. Price includes motor rail, belt, pulley, mitre gauge, fence, splitter, guard. Extensions \$3.50 each.

POWER KING #3001

BALL BEARING TILT/ARBOR SAW

Dollar for dollar, here's the greatest saw value on the market today! It's fast, accurate, easy to operate—ruggedly built—with features usually found only on saws costing much more!

Handles big range of work—cabinets, cupboards, bookcases, shelves, home repairs, model building—makes fine woodworking easy and more fun. Quickly pays for itself in the money you save.

Tilt/arbor design keeps work and table flat. Blade cuts $2\frac{1}{4}$ " deep. Table is $25\frac{1}{2}$ " x 16" with two low-cost extensions. Sheet steel base—precision ground grey iron table. Quick-positioning rip fence and sealed ball bearings.

See the great PK 3001 at your Power King dealers soon, or send today for free catalog.

**NEW
FREE
CATALOG**

Name _____

Address _____

City, State _____



ATLAS PRESS CO.

842 N. Pitcher St., Kalamazoo, Mich.



**MATCHED PRECISION TOOLS FOR
WOODWORKING AND METALWORKING**

P.S.

Last minute news & notes...

AUTO NOTES: Look for at least one switch from straight to V-8 engines, and from coil back to flat springs, among the major makes. . . . A new model with an old nameplate, to be announced soon, will be more than the expected "face lift," will include many styling and mechanical changes. . . . The trend to higher compression continues--a 7.8-to-1 ratio is on the way.

A SMILE may be worth more than 10,000 words in the next presidential campaign, says David Sarnoff of RCA. By then, he expects 20,000,000 television sets to be tuned in on coast-to-coast networks, making it possible for 80,000,000 persons to see as well as hear the candidates.

RUBBER FENDERS are being substituted for the metal ones on all Detroit street cars. They are mounted over the wheels of each truck to protect electrical gear from mud and grease. . . . A RUBBER COMPOUND that can be mixed with tar has also been developed, to protect airport runways from the dire effects of the fuel spilled by jet planes.

A SUN-HEATED HOUSE requiring only 10-percent auxiliary heat is perfectly feasible around Boston. That's the advance report on data to be revealed at a symposium at M.I.T. this month. The M.I.T. experimental house (PS, Mar. '49, p. 106) now has its first full winter season behind it. . . . Meanwhile Dr. Maria Telkes is keeping her Dover, Mass., sun house at a cool 72° all summer by reversing the cycle of her chemical heat-storage system. She also reports that she's eager to build a \$10,000 house to show the practicality of heating low-cost homes by solar radiation. The house in Dover has been heated entirely by the sun for two winters.

500,000,000,000,000,000,000,000,-
000,000,000,000,000,000 YEARS from
now half of the radioactive atoms
of Tellurium 130 that are now being
studied will have decayed, but the

other half will still be "hot." Until Argonne National Laboratory researchers came up with this figure, the stuff was supposed to be stable. . . . WHEN LOST in the rough, golf balls containing radioactive materials can easily be found with a Geiger counter. The balls were made by B. F. Goodrich researchers as a stunt--not for sale.

ODORS can be neutralized now with a tiny 4-watt lamp bulb that gives off ozone. The new lamps, made by GE, are being put in automatic clothes dryers now, but can also be used in kitchens, baths, and cellars.

SPRAY BOMBS containing plastic-covered aluminum particles can be obtained now. All you have to do to put a new decorative weatherproof coating on metal fixtures is press the cap--and wave your hand to distribute the stuff evenly. Chamberlain Metal Products, 1466 West Madison St., Chicago, makes them.

RADIO SIGNALS marred by static or fading are re-sent automatically now on RCA's radioteletype circuits between New York and Holland. The innovation is called ARQ (automatic repetition request). At the transmitter a memory unit made of 21 condensers holds each signal a fraction of a second--so it can be repeated when the receiving apparatus "asks" for it.

COLLAPSIBLE TUBES such as tooth-paste comes in may soon be used as containers for catsup, mustard, peanut butter, jelly, etc. A NEW ZINC ALLOY with the strength and electrical characteristics of brass has been developed for possible use in lamp sockets and bases. . . . THE ARMY will slick up 2,000,000 pairs of combat boots, left over from the war, by coating them with a plastic that keeps out water and takes a shine.

The Editors

"SURE, ALL MUFFLERS LOOK ALIKE..."

**BUT WHAT A DIFFERENCE
WHEN YOU GET A GENUINE
FORD MUFFLER!"**



"THEY'RE BEST FOR FORDS," MY MECHANIC TOLD ME, "AND THEY'RE THE LOWEST PRICED QUALITY MUFFLERS WITH ALL THESE FEATURES..."



"FORD MUFFLERS ARE DOUBLE-WRAPPED...THEY ACTUALLY HAVE TWO SKINS, FOR EXTRA SILENCE AND LONGER LIFE."



"THIS FREE-FLOW DESIGN GIVES YOU BETTER GAS MILEAGE. AND SAFETY-SEAMS AT BOTH ENDS ELIMINATE GAS SEEPAGE."



"IN SHORT, THEY'RE MADE RIGHT TO FIT RIGHT AND LAST LONGER IN FORDS." "MISTER," I SAID, "YOU'VE CERTAINLY CONVINCED ME."

**"AND I'VE LEARNED IT'S THE SAME
WITH ALL GENUINE FORD PARTS. THEY'RE
BUILT TO SAVE ME TIME, MONEY, AND
THEY MEAN REAL
SATISFACTION"**



AVAILABLE WHEREVER YOU SEE
THIS SIGN AT ALL FORD DEALERS AND
SELECTED INDEPENDENT GARAGES



**KEEP YOUR FORD
ALL FORD !**



Minute Man... 1950

Some things have changed since 1776, but not this.

We here in America still need "Minute Men" to protect our liberties—just as much as we needed "Minute Men" to win them.

Charles H. Boyd, farmer, veteran and student, exemplifies our modern version of those men who stood and fought at Lexington and Concord.

He is the 1st Sgt. of Headquarters Company, 816th Field Artillery Bn., an Organized Reserve Corps unit, located in Columbia, Missouri. He, and thousands of Army Reservists like him, keep themselves and their units trained and ready to defend our country and our freedom by being active in the Organized Reserve Corps.

Find out more about this vital component of our defense establishment by visiting your nearest U. S. Army and U. S. Air Force Recruiting Station or your nearest ORC Unit Instructor.



SERGEANT FIRST CLASS BOYD USING FIELD TELEPHONE DURING SUMMER CAMP MANEUVERS

This One



82QT-BXZ-FRRF



NOW ANY AUTO REPAIR

Can Be "Duck Soup" For You!

This Brand-new Edition of MoToR's AUTO REPAIR MANUAL Shows YOU . . . How to Repair—Quickly, Easily—Any Car from 1935 thru 1950! Over 200,000 Service & Repair Facts on 741 Models! Over 2100 "How-to-Do-It" Photos, Drawings, Diagrams! 35,000 Essential Dimensions in Over 200 "Quick-Check" Tables! Almost 750 Big Pages of Step-by-Step Instructions!

HERE'S the huge, illustrated "How-to-Do-It" volume you **NEED** to "whiz through" **ANY** job on **ANY** standard car built from 1935 thru 1950! Save work on those "ornery" jobs that can be such a "head-ache"! Make **MORE** money by doing more jobs in **LESS** time. And you can examine this giant Manual for 7 days **FREE!**

Now you can fix anything from carburetor to rear end, shaky '35 model to shining '50 quickly, easily, right—with the tools you have! Just look up make, model and job in Instant Index. Then go to it. Step-by-step **ILLUSTRATED** instructions make every operation "duck soup" for you!

EVERYTHING You Need to Know to Repair Any Make or Model Car Built Since 1935!

MoToR's **MANUAL** takes nothing for granted. Starts at the very beginning—tells you how to identify all 741 car models—where to start on each job—leads you easily and quickly through entire operation!

Covers 741 Models—All These Makes!

American	Dodge	Mercury
Bantam	Ford	Nash
Auburn	Frazer	Oldsmobile
Austin	Graham	Packard
Buick	Hudson	Pierce Arrow
Cadillac	Hupmobile	Plymouth
Chevrolet	Kaiser	Pontiac
Chrysler	Lafayette	Reo
Cord	La Salle	Studebaker
Crosley	Lincoln	Terraplane
De Soto	Lincoln Zephyr	Willys

Published by MoToR, The Leading Automotive Business Magazine. MoToR's manuals assure high standards of repair work.

Same FREE Offer on MoToR's TRUCK & TRACTOR REPAIR MANUAL

BRAND-NEW! Covers **EVERY** job on **EVERY** popular make gasoline truck or farm tractor made from 1936 thru 1949! Over 1400 pictures, 961 pages, 300,000 facts. Used by Armed Forces.

All types Gasoline Engines, Fuel Systems, Governors, Lubrication Systems, Starters, Generators, Clutches, Transmissions, Axles, Torque Dividers, Transfer Cases, Brakes, Steering, etc.

For **FREE 7-DAY TRIAL**, check box in coupon at right.

Beginners will find helpful guidance for every kind of repair and service job imaginable! Experts will be amazed by the shortcuts they'll discover! No wonder hundreds of thousands of men call this giant volume the "Auto Repair Man's Bible!"

Custom-Built to Fill YOUR Needs. From Over 150 Official Shop Manuals!

Here, in "Quick Reference" tables and "How-to-Do-It" words and pictures, are the official facts and instructions you **MUST HAVE** to tune up, service or repair any car! Priceless help that saves "guess-work"—eliminates trial and error!

Engineers from every auto plant in America worked out these procedures for their own car line. Now the editors of MoToR have gathered together this wealth of "Know-How" from over 150 Official Factory Shop Manuals, "boiled it down" into clear terms in one handy book!

Win New and Greater Prestige! Earn More Money!

MoToR's Manual makes every operation simple as A-B-C! So easy you'll find yourself tackling jobs you wouldn't think of doing before! And you'll win added prestige and more money in the bargain!

Here's **ILLUSTRATED** step-by-step guidance on all types of engines . . . Chokes . . . Fuel Pumps . . . Ignition Systems . . . Oil Filters . . . Generators . . . Carburetors (including new GM Rochester) . . . Starting Motors . . . Clutches . . . Automatic and Semi-Automatic Transmissions . . . Overdrives . . . Universals . . . Axles . . . Brakes . . . Steering Gears . . . Shock Absorbers, Body Service, Tool Application, Body Repair, Metal Finishing, Painting, Spraying, etc.

Factory Specifications, Adjustment Tables, Tune-Up Charts, Tables of Measurements, Clearances, Overhauling, Replacement Facts—**AND MUCH, MUCH MORE.**

SEND NO MONEY Mail FREE-TRIAL Postcard NOW!

Send no money. Try this book—at our risk—for a whole week absolutely **FREE!** Test it in your own garage or shop. If it doesn't pay for itself in 7 days, just return it and pay nothing. Mail postage-paid **FREE-trial card NOW**—to MoToR Book Dept., Desk 2J, 250 West 55th St., New York City 19.

Just 2 of the Many Letters of Praise



"MoToR's Manual paid for itself on the first 2 jobs, and saved me valuable time by eliminating guesswork."—**W. SCHROP, Ohio.**



"Fixed motor another mechanic had worked on half a day. With your Manual I did it in 30 minutes."—**C. AUBERRY, Tenn.**

FREE 7-DAY

Return and Pay if Not Satisfied

HERE IS CHEVROLET TUNE-UP CHART

TUNE-UP CHART

Year	Model	Spark Plug Gap, Inch	Breaker Gap, Inch
1935			

COVERS CONSTRUCTION OPERATION & MAINTENANCE OF BUICK DYNAFLOW

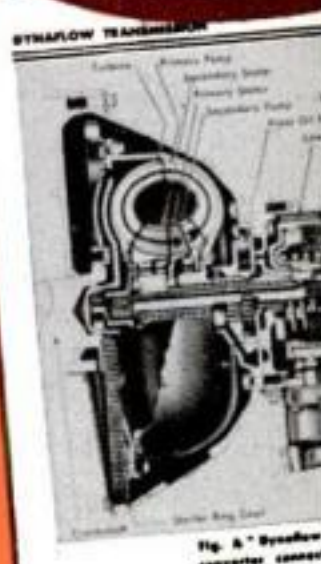


Fig. A. Buick Dynaflow converter connects

HOW TO FORD

FORD & MERCURY



Fig. 23. Clutch pedal adjustment, 1939-48. Free travel should be from 1 to 1 1/4 inches.

FAMOUS SPORTSCASTER

**BILL
STERN**

**"I'M ON THE
AIR HOURS
AT A STRETCH**

— naturally I have to think
of my throat. The 30-day
test proved to me how
mild Camels are! "



HIS PLAY-BY-PLAY, blow-by-blow coverage of the big-time sporting classics from coast to coast has a following that runs into the millions. Broadcasting from the major bowls and ball parks, Bill Stern's voice gets a year round workout.



R. J. Reynolds Tobacco Co.,
Winston-Salem, N. C.

NOTED THROAT SPECIALISTS REPORT ON 30-DAY TEST OF CAMEL SMOKERS...

Not one single case of throat irritation due to smoking **CAMELS**

Yes, these were the findings of noted throat specialists after a total of 2,470 weekly examinations of the throats of hundreds of men and women who smoked Camels—and only Camels—for 30 consecutive days.



Make your own 30-Day Camel MILDNESS Test

in your "T-ZONE" (T for Throat—T for Taste)